Railway Age

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EDITORIAL
Railway Age

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More About Public Relations Work

THE RAILWAYS are fully and admirably equipped to present their case to law makers, commissions and courts. But law makers, commissions and courts are not going to settle the future of the railways. They are merely agents—the public is their principal. In this, as in other affairs, the principal will in the long run determine the policies carried out by the agents.

The Transportation Act is in most respects a good law. The Interstate Commerce Commission used its provisions to force advances in certain state rates. The Supreme Court of the United States upheld both these provisions and the action of the commission. But the commission would never have had a chance to set aside these state rates, or the courts to uphold its action, if the Transportation Act had not been passed by Congress. It would not have been passed by Congress if public sentiment had not been favorable to the railways at the time.

Bills to repeal every provision of the act that is intended to help the railways already have been introduced in Congress. They will be passed if public sentiment favors them. They will be defeated if public sentiment opposes them. No amount of money and ability which may be spent in presenting the case of the railroads to Congressional committees, commissions and courts will avail to secure fair and wholesome regulation unless the facts and arguments presented reach and influence the public. The railroad problem will not be solved in Washington. How can anybody think it will be after the experience of the last 15 years? It will be solved in every single city, town and rural district of the United States.

Is it not a curious thing that so many railways—practically every railway in fact—should recognize the need for employing men of great ability to represent them before legislative committees, commissions and courts, and that so few should recognize the need for employing men of equal rank and ability to represent them before the public? Let us be frank about it. Is it not a fact that most railway managements so greatly underestimate the importance of effective public relations work that they would think a man was a little crazy who should suggest that each large road should have in charge of its public relations work a man as highly paid and as able as those at the head of its legal, operating, traffic and accounting departments? But has not the problem of establishing satisfactory relations between the railways and the public been proved by the experience of many years to be quite as difficult as any other problem confronting railroad managements? Is it not at least as far from solution as any other big problem of railroad management? The answers to these questions are obvious. If the problem presented by public relations is so big, so difficult and so far from solution, how can it be expected it will ever be solved unless by men who are able in proportion to the bigness of the problem and who can devote their time to it.

It may be said that the problem of public relations is the problem of each of the railroad departments which come in contact with the public. There is something in that view. But if so, the departments which already come in contact with the public have not done their work right. Otherwise the railroad situation could hardly be what it is today, and what it has been for years past.

The present railroad situation has one important feature which never existed prior to government control. The railway labor organizations are strongly in favor of government ownership. They would prefer to have coupled with it the Plumb Plan of employees' management, but if they cannot get that they want government management. Government control and agitation carried on by labor leaders have made a large part, and we fear a majority, of the railways' own employees active critics and enemies of private management. They are spreading propaganda against private management in every part of the country. Employees need education, and the public needs education to nullify the propaganda of the labor unions.

It may be that adequate and effective public relations work could be done through the existing departments of the railways. One thing is certain, however, and this is that it never has been done through them, and is not being adequately and effectively done through them now. Past experience may be misleading, but it indicates that adequate public relations work never will be done on most railways until a special department closely co-ordinated with the other departments, and especially with the president's office, is established on each large railway system. The president gets his information and recommendations regarding traffic,

operating, engineering and other matters from specialists on those subjects in the existing departments. He bases his policy largely on this information and these recommendations. Past experience makes it doubtful if he will get the information and recommendations regarding public relations that he needs until he has high grade specialists on public relations to give them to him.

In view of all that has happened to the railroads within the last 15 years owing to an uninformed and hostile public sentiment, it is surprising how much has been done to nullify the effect of this public sentiment and how little has been done to change the public sentiment itself, which is the cause producing the effects. Why devote so much energy and ability to defeating proposed adverse legislation after it has been introduced in the legislatures and Congress, and to fighting it in the courts after it has been passed, and so little energy and ability to changing the public sentiment which causes the legislation to be introduced and passed? Why, in other words, so often abandon the front line trench almost without a struggle, with the result that most of the fighting is done in the last trench, the loss of which means that all is lost? Or, to use a specific illustration from very recent experience, why let hostile sentiment regarding the Transportation Act be created among the farmers by false and unfair propaganda, which in many parts of the country was allowed to go almost unanswered for months, and then make a strenuous effort in Washington to defeat legislation to emasculate the Transportation Act which has been introduced by leaders of the agricultural bloc to cater to the sentiment among farmers thus created?

Under present conditions it would be a good thing if every high railway officer would place where he would have to read it every day a sentiment attributed to Abraham Lincoln: that with public sentiment everything is possible; without it, nothing can be done.

Railways Should Participate in Lumber Conference

The railways are among the largest users of lumber and as such they have much in common with the producers of this commodity. Yet there has long existed a controversy between the manufacturers and the railway users of lumber, particularly regarding sizes and grades. The saw mill operators have complained of the insistance of railway purchasers for certain sizes not in common use elsewhere preventing orders for such materials from being filled from stock and requiring that they be cut special. Furthermore the producers have maintained that the manner in which the railways place their orders prevent them from utilizing the entire tree to the best advantage. The railways on the other hand object to being forced to accept standard sizes not adapted to their uses and feel that the volume of their purchases entitles them to secure these sizes and grades which are adapted especially to their needs. They also insist that they are in a better position to know their needs than the manufacturers and that if they do not use the entire tree it is the problem of the manufacturer as a merchandiser to develop other demands for the surplus material as the packer has done so successfully with his various meat products. In view of these conflicts of opinion it is important to note that Herbert Hoover, secretary of commerce, has called a conference of lumber manufacturers and users at Washington during the week of May 22, and that the railway users of lumber are invited to participate in this conference on Thursday of that week when attention will be given to the railway phases of this problem. The large volume of lumber and lumber products purchased annually by the railways warrants the roads in seeing that they are properly represented at this conference in order that their interests may be protected in any standards which may be developed, while at the same time promoting the maximum economy in the cutting and use of lumber products.

English the Railway Language

The second article on the International Railway Congress at Rome appears on another page of this issue. In addition to summing up the reports of the various sections, Mr. Dunn has written rather informally his opinions of the value of the Congress. The diversity which exists between European and American railway practices does not, he feels, make it improbable that the two continents can learn from each other, but rather the contrary—the very fact that methods and equipment differ so widely makes any effort to exchange knowledge the more likely to be fruitful. Unfortunately, however, delegates from English-speaking countries were not able to profit by the sessions of the Congress as much as could be desired because the French and Italian languages were used almost exclusively while English, the language of those who operate by far the greater part of the world's railway mileage, was used but slightly. Whatever the reason for this, there can be no question but that the English-speaking delegates did not and cannot secure the greatest benefit from a convention conducted in an unfamiliar tongue. "Modern Transport," a British contemporary of ours, in speaking of a convention to be held shortly in London, expresses the thought that it will be of more value than the International Railway Congress because English only will be used. The next International Railway Congress will be held at Madrid, Spain, in 1927—a long time off. But now, while the Rome convention is fresh in mind, is the time for action. Sessions in English to run concurrently with those in other tongues do not seem too much to ask, in view of the predominance of English-speaking peoples in the operation of the railways of the world.

Car Wheel Grinding Effects Savings

Millions of chilled cast-iron car wheels are in service on American railroads and, owing to the large number involved, any improved method of maintenance or securing greater wheel mileage is of importance. Railroad men of wide experience advocate the grinding of cast-iron car wheels, both new and those with flat spots, maintaining that increased wheel mileage and economy are effected. In view of the possible savings, the subject of car wheel grinding is highly important and of vital interest to higher mechanical department officers. Regarding this practice E. A. Murray, shop superintendent of the Chesapeake & Ohio at Huntington, W. Va., says, "During the year 1921, 466 pairs of cast-iron car wheels were ground at Huntington at a saving of $13.80 per pair, or a total saving of about $6,400. It requires on an average

45 min. to grind out the flat spots on one pair of wheels. Experience has shown that the investment for the grinding machine pays a good dividend, in addition to improving the condition of the wheels. With the great number of car wheels ground at this point, we have never had one that has been through the process of grinding returned on account of sliding flat." This testimony strengthens the argument of those who favor car wheel grinding. Apparently a car wheel which is once ground true and concentric with the journal is far less likely to be gripped by the brake shoe and develop another flat spot. The evidence seems to show that there is also less danger of hot boxes with ground wheels owing to the fact that hammer blows, tending to cause the journal box packing to leave the journals, are eliminated. There are several well-founded arguments in favor of grinding new wheels before they are placed in service and this practice is being followed on another large eastern road in the case of chilled cast-iron wheels under local passenger equipment, the advantages claimed being easier riding wheels and coaches and less danger of the subsequent development of flat spots.

Confidence in the Future

It has been distinctly encouraging to note in recent months the growing number of construction items of magnitude, indicating that the most progressive railroads are taking real steps not only to remedy existing inadequacies but to provide some measure of expansion for the future. The past year or year-and-a-half has been rife with pessimism and it has not been easy to shake loose from it. Business today needs some sort of a pace-maker and the railways are taking that position. Naturally any business they stimulate reacts to their own advantage; in their potential purchasing possibilities they have a powerful and tremendously effective influence for the quicker betterment of general business. Many roads have large budgets for construction and equipment needs which for good reasons they have not as yet felt that they could start. Others, perhaps more able financially or more willing to gamble on the future, have started programs which will shortly run into large expenditures. The most recent item is that of the New York Central's Castleton bridge project calling for an ultimate expenditure of about $20,000,000, of which probably about twelve million will be spent in the next two years. It is only a short time ago that this road ordered new equipment and materials involving an expenditure in the neighborhood of forty million dollars. The stimulus to general business from these two expenditures cannot help but be felt. Certainly that system will be better prepared to handle the traffic which is bound to come and to profit from it. One distinct need today—and one clearly emphasized by the recent activities of such roads as the New York Central, the Santa Fe and a small number of others—is a thorough confidence in the future and a determination to go ahead.

Annual Reports and Publicity

The 1921 annual report of the Lehigh Valley, a review of which appears on another page, is a document of only 22 pages. It is, however, one of the most satisfactory annual reports which it has been our pleasure to examine. The reason for this is that the report presents to the Lehigh Valley stockholders a picture of the company's operations as adequate and complete as many other railroad companies succeed in giving in two or three times that number of pages. The report is also characterized by a new and interesting feature. In addition to the usual remarks of the executive there appears at the end of the report a statement to security holders which unquestionably will be read by them with interest and value. The remarks at the end of the report present an analysis of the present railroad problem, the attempt being made to bring home to the stockholder and bondholder his or her particular interest in the welfare of the railroads. The annual report may be regarded as a necessary presentation of the year's statistics or it may be regarded as a means of informing the security holders of what the railroad is doing or what it is trying to do to meet its particular conditions. It can easily be, and too often is, the first without the second, for it is not an easy task, even for those required to do it, to analyze a complicated mass of statistical data. It is the modern idea, however, that the security holder should be told the facts and told equally what the facts mean. The fact that a stockholder is a stockholder shows him to be in a receptive attitude to hear the executive's story and the railroad should be fair to him and tell him that story. The Lehigh Valley has taken a progressive step that we hope will be followed by such of the other railroads as have not as yet realized the value of taking their stockholders fully into their confidence.

Radio Legislation and the Railroads

FURTHER LEGISLATION for the control of radio communication is expected to be passed at this session of Congress, which will authorize the President to appoint a permanent board to control all radio communication in the United States. The bill, which will be an amendment to the radio act of 1912, under which radio communication is at present regulated, will be introduced by Representative Wallace H. White of Maine and is designed to give the Department of Commerce greater control and regulation over this new form of communication. The powers, however, will not be absolute. It is proposed that the permanent board of control will have a member each from the army, navy, commerce, post office and agriculture departments and five civilian members representing the public, skilled amateurs, manufacturers, scientific and other civilian interests.

The possibilities for the use of radio in the railroad field should not be overlooked by the government or by the railroads, for its application to railroad service is already receiving careful study by a committee of the Telegraph and Telephone section of the American Railway Association, while a number of railroads are conducting researches to ascertain its applicability to varying conditions of service. There is a large field for the use of short range sets to meet emergency requirements occasioned by the loss of pole lines because of floods, sleet storms, etc.; for trains marooned by storms or other reasons; for construction gangs and wrecking crews, etc. Other possibilities for the use of radio are for communication between the head and rear ends of trains, for long range operation between general headquarters and division points, and for automatic train control. It is also conceivable that it may find use in the signal field. While it is evident that these applications will create numerous complications the importance of radio to railroad work is so great that the railroads should receive consideration in the administration of any legislation relating to it.

Herbert Hoover, as secretary of commerce, under whose jurisdiction it is contemplated that the control and regulation of radio will come, has repeatedly pointed out the importance of the railroads to the welfare of the country and it is to be presumed that if the roads desire to be represented on the board of control he will give careful consideration to such a request. The railroads should be repre-

sented on this board in order that all avenues of communication may be available for their use, because the railroads, unlike the commercial telephone and telegraph companies, have no cross country lines on which they can maintain communication when something happens to their lines of communication along the right-of-way. Action should be taken for the protection of their own interests.

An Excess of Well Intentioned Zeal

THE Railroad Labor Board has decided that the contracts entered into between the Indiana Harbor Belt and the Burnham Car Repair Company for the operation of its shops "are in violation of the Transportation Act insofar as they purport or are construed by the carrier to remove said employees from the application of said act, and that those provisions of the contracts affecting the wages and working rules of said employees are in violation of decisions No. 2, No. 119 and No. 147 of this Board."

This decision, particularly as it is the first of some 36 similar cases, must be regarded as one of the most important and far-reaching which has yet been made by the Board. It may be regarded from two angles. On the one hand, it must be admitted that it was the natural one for the Board to make in the light of its previous policy and activity. On the other hand, it must be considered as the latest step in a long series of decisions, in all of which the Labor Board assumes the right to judge whether or not it has been exceeding the authority granted to it in the Transportation Act. *The Railway Age* believes that in the activities of the Board culminating in this decision the Board has gone too far. The railways will be very much remiss in their duty if they do not fight the decision and carry the matter, if necessary, to the highest courts.

It is natural for an ambitious man, or a group of men, to try to secure all in the way of position and power that circumstances permit them to attain. This doctrine is the very definition of the word ambition. It is one of the most important elements in the theory of evolution or the survival of the fittest, or whatever else one may call it. The Constitution of the United States gives due regard to it because the basic principle of our form of government is that it shall function as a system of checks and balances. The creators of our government feared that there might some day arise a power which in those days, of course, they personified in King George III of England. They, therefore, worked out a theory that there should be three departments of government, the executive, the legislative and the judicial, each of which was to serve as a check or balance on the other two.

This theory is a far-reaching one. It was applied to the Interstate Commerce Commission and that body went through a long period of trying and testing in the courts and in Congress before its powers were determined to the extent that they are today. The Labor Board thus far has had no such trying and testing. The railroads—with the single important exception of the Pennsylvania—have been content to sit back and permit the Labor Board to gain more and more power and more and more authority day by day. The result is that the Board has taken unto itself administrative functions and has been allowed to wield a power which, in our belief, was not granted to it by the Transportation Act.

The Labor Board thus far, therefore, has been primarily its own judge of where its power extended or did not extend—except as always in the Pennsylvania case. This is not as it should be. It is not best for the welfare of the Labor Board, for the railroads, for the public, or for the basic principles of our form of government that it should be worked out in this way.

There are those who believe that the most important factor in deciding the labor disputes in a public utility is the force of public opinion. The labor provisions of the Transportation Act were purposely framed with that idea uppermost. There seems, however, too much of an attitude on the part of the railway managements to forget this important aspect of the situation. The Labor Board should not be the arbiter of its own activity.

Realizing as we must that the Railroad Labor Board is an ambitious body seeking to secure all the power and rights that it can ethically secure and that it is properly doing its utmost to justify its existence as a part of our government, we may go further. Taking the decision itself in the Indiana Harbor Belt case, we find these words: "On the other hand, the Transportation Act was not enacted primarily for the protection of the rights of either carrier or employee except insofar as such protection was involved in the paramount purpose of the act; that is, to insure to the public, as far as possible, efficiency and uninterrupted railway transportation by protecting the people from the loss and suffering incident to the interruption of traffic growing out of controversies between the carriers and the employees who do their work. This act is the congressional assertion of a public right."

There is also a statement that "it is important if by such contract the carrier seeks to remove its employees from under the application of a law which the people have enacted for the purpose of maintaining industrial peace upon the railways." Of course, in this case, there was no question of the interruption of transportation that is apparent on the surface. The employees of the Burnham Car Repair Company were not threatening a strike. But the point is that the Labor Board has, if anything, given an exalted importance to the fear of interruptions to transportation. The Transportation Act, however, also requires the Interstate Commerce Commission to establish a level of rates which will yield a certain rate of return "under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment. . ."

Why have the railroads contracted for the repair of equipment? One of the best reasons we have seen is given in a report recently issued by the National Industrial Conference Board—Research Report No. 46 dated February, 1922, and entitled, "Railroad Wages and Working Conditions." This report contains on page 97, Chart 9: Hourly earnings, skilled shop labor, Class I railroads, compared with skilled labor in foundries and machine shops. The chart shows, among other things, this rather pertinent fact that whereas in July, 1914, skilled labor in railroad shops and in foundries and machine shops outside the railroad field hourly wages were nearly on a parity, in October, 1921, skilled railroad shop labor was receiving an hourly rate of 75.4 cents but in other shops a rate of slightly over 60 cents, a difference of say 15 cents. For December a figure is given for labor in foundries and machine shops of 57.3 cents or 18.1 cents less than the October railroad shop figure. The report contains also many other interesting details concerning the rules and working conditions in railroad shops—notably the effects of the national agreements as modified by the Labor Board decisions. Among other things it is pointed out that in railroad shops much work is carried out by men classified as machinists which in other shops would be done by helpers or handymen.

President A. H. Smith, of the New York Central and of the Indiana Harbor Belt has added some further interesting data. He is quoted as saying: "The facts in the case are that the men employed in these shops notified the Labor Board that they were satisfied with their wages and working conditions and protested against any interference on the part of the Labor Board. *Furthermore, the average wages which they are now receiving are in excess of the wages prescribed by the Labor Board as just and reasonable.* The striking point, however, is that the results show *an increase of 40 per cent in efficiency* as compared with the operations of these shops by the railroad company under the rules and regulations presented by the Labor Board."

The underlying reasons, then, for the contracting of the shops are: (1) that the Labor Board's scale is considerably in excess of that paid similar labor elsewhere; or (2) that when not working under the provisions still remaining from the national agreements the labor was 40 per cent more efficient.

It must be remembered that in paragraph (d) of section 307, the Transportation Act says: "In determining the justness and reasonableness of such wages and salaries or working conditions the Board shall, as far as applicable, take into consideration, among other relevant circumstances, (1) The scale of wages paid for similar kinds of work in other industries. . ." This, quite apparently, the Labor Board has not done. The railroads, in contracting out their shops, did attempt to do so. It would appear that the Labor Board is in a position where in altogether too great a degree it is trying to subsidize railroad shop labor at the expense of the farmer and the consumer who, in the long run, pay the additional wages or who pay for the reduced efficiency under the railroad shop rules.

The Labor Board's decision in the Indiana Harbor Belt case is in line with its previous decisions in the matters of the wages and working conditions of railway shop labor. The Board, in establishing the wages, should seek to insure, if it can, the maintenance of these wages and working conditions in all railway shops. From its own point of view, the Board is correct in believing that the contracting of the shop is an evasion of its previous decisions. But, the carrier must be regarded as being between two fires—the necessity of operating efficiently and economically, and the Labor Board's decisions which in effect prevent it from doing so as far as its shops are concerned.

Matters cannot be allowed to go on in this way. The question should not be allowed to go by default. That is why we maintain that the railroads should come out fairly and squarely for their rights. They should go to the courts or to the public for an ascertainment of how far the Board's power extends, or was intended by the Transportation Act to extend. There is no precedent under the Constitution of this country which permits the Labor Board as a governmental body to be allowed to gather in authority in all directions without control or as it, in its own mind, sees fit.

New Books

Index-Digest of Decisions of United States Labor Board; Compiled by Bureau of Information of the Southern Railways; Published and Distributed by Railway Accounting Officers' Association, 1116 Woodward Building, Washington, D. C. Bound in paper. 6 in. by 9 in. size, 332 pages. Price 50 cents. In lots of 100 or more, 25 cents.

The present edition of the Index-Digest succeeds the first edition gotten out last September. The book gives the gist of every decision rendered by the Labor Board up to May 1, 1922. References are given so that the full text may be obtained. Experience has demonstrated, however, that the use of this Index-Digest eliminates the time and labor of reading through the full text of the decisions.

Under alphabetical subject headings it gives a summary of every decision relating to each subject—containing all the necessary practical information that anyone would ordinarily have occasion to use. This arrangement enables one readily to obtain desired data regarding decisions.

The new edition has the added feature of two sections, respectively showing by roads and by labor organizations the decisions to which each has been a party. These two additions should prove useful in cases where the particular decision or principle involved is remembered by the name of the labor organization or the name of the railroad. In other words, the publication is indexed and cross-indexed in almost every conceivable way.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

"Our Road"

NEW YORK

TO THE EDITOR:

We all recall that before the days of Mr. McAdoo's reign as autocrat of the railroads, there was what we often call "high morale" among railroad men—in the train service particularly; meaning that there was a company spirit and every man took pride in his road, its equipment, etc.

Coming down on the Lackawanna last Sunday I ran across a flagman that took me back to those by-gone days. He took personal pride in pointing out the improvements this railroad had made in the past few years, the location of the old abandoned line, the drop after passing Pocono Summit, the Gap as seen from the distance, and many other things that might interest a weary traveler. After passing a dairy plant he went on to tell how many cars the Lackawanna carried to New York daily as its share in supplying milk to the great city, and then stated that within 15 minutes we would pass the empty milk trains returning; in less than 20 minutes three empty milk trains passed going up the mountain.

All this was not overlooked by the usual traveler, but what impressed me most was he always referred to the Lackawanna as "our road," "our line," "we," "us" and similar personal terms; all of which leads me to hope that some day the men will have the same interest in their road as they had before the days of federal control.

E. F. GARWOOD.

A Permanent Railway Supply Exhibit in Chicago

CHICAGO.

TO THE EDITOR:

Chicago is universally recognized as the railway supply center of the United States. This, together with the fact that more railways have general offices in that city than at any other point in the country, makes Chicago the ideal location for a permanent railway supply exhibit. If a census could be taken of all of the railway supply concerns which maintain headquarters in Chicago and also of those with branch offices in that city, I feel sure that one would be surprised at the magnitude of the industry centered there. Furthermore, the amount of money spent annually for office rent by these companies would pay the interest on a very large investment to provide a building to house this exhibit.

My idea is that this building should be located on the lake front and have track connection. The ground floor should be arranged for the exhibition of cars, locomotives, snow plows, wreckers and other heavy railway equipment standing on its own wheels. The second and possibly the third floors might well be adapted for the exhibition of even the heaviest of shop tools with a crane or other hoisting equipment to raise these tools from the first or track floor to the second or third floor. Permanent exhibits of railway supplies, light machine tools, pneumatic tools and other devices now being sold to the railways could be presented on three or four additional floors. Above these exhibition floors

office space could be provided to accommodate at least most of the railway supply companies now scattered throughout the city. Above the offices there should, if possible, be a number of sleeping rooms with baths and on the very top of the building a suitable club.

Chicago is the central point to which all railway and railway supply men come or through which they pass at intervals. The establishment of a large exhibit of a wide variety of railway tools and equipment in one building will afford an educational opportunity for these men which they will not fail to take advantage of. It will also conserve the time and traveling of the men interested in these devices.

HARRY VISSERING.

The Committee Plan

CHICAGO

TO THE EDITOR:

The railroads have numerous associations—the American Railway Association with its various divisions, the General Foremen's, Traveling Engineers' Associations and others. In our industrial plants we have safety committees and our labor organizations have shop crafts committees. Why? For the fundamental reason that two heads are better than one; that a group of men can evolve ideas, make suggestions and consolidate operations quicker and make fewer mistakes than if one individual attempted to dictate and rule.

Now, knowing these things, why is it that in railroad circles we fail in this collaboration? Why is it we admit that we must co-operate with other railroads in certain respects and ignore the committee idea in our inter-departmental workings? Why is it that the average superintendent of motive power or shop superintendent arrogates to himself the full power of dictatorship—"You must do that in this way," instead of "Let's get together and decide which is the better way?"

What happens in a shop staff meeting? The shop superintendent or master mechanic starts in with one department, asks questions as to progress of work, tells his foreman what to do, passes on down to the next foreman, etc.

Does the superintendent of motive power call in his master mechanics and shop superintendent to get their views when he is getting up specifications for a new lot of locomotives? He does not; he calls in his mechanical engineer and instructs him to specify this and that. And so on all the way through the mechanical department organization.

This is a weakness in railroad work; a failure to get the best there is out of the organization and a careless handling of the company's money. Why not adopt the committee plan on these matters of new equipment; why not work it out in the plants and why not say, "We did this," instead of "I did this?" On the other hand it could be said, "We failed to do this," instead of, "I failed to do it."

The committee plan is not a medium for "passing the buck" or shifting of responsibility. To the contrary, it is a spreading of responsibility, a feature that will bring to you the undivided interest of several to focus on the object, not one.

Were I a shop superintendent, a staff meeting would be a committee meeting. I would consider that my highly trained locomotive men could make many good suggestions to the car department and while my car department organization may not be as technical as the locomotive, nevertheless some of these car men could make able recommendations to the other side.

I would select the weakest link in my departmental organization and in open meeting would lay the difficulty before my committee. As an example: "The boiler shop is way behind on the work and as a result we are losing output. Now this affects all of us; the tin shop, blacksmith shop, and principally the back shop. A loss of output reflects on our management, not mine. What have you to suggest, Mr. Back Shop Foreman? Your remarks are not a criticism on the boiler shop but, to the contrary, they will be a help."

This back shop man, who has been worrying about the tie-up in his work, will immediately say what particular work is holding him up. If it's flues, your machine shop man will probably make a recommendation pertaining to the equipment in the boiler shop for handling flues. Your blacksmith foreman will have some ideas and the committee will regularly pass on the suggestions and without doubt some excellent thoughts will be brought out that make for speed and economy.

Instead of this method of handling having an adverse effect on the boiler shop man, it would put new heart into him; he would feel that his burden has been distributed and all are interested in him and through him in his department.

GRANT GIBSON.

Capitalizing the Cost of Tie Treatment

WASHINGTON, D. C.

TO THE EDITOR:

In your issue of February 18, page 416, you published an abstract of a paper by Earl Stimson, chief engineer maintenance, Baltimore & Ohio System, and in your issue of April 29, page 1003, there appeared a letter by F. S. Schwinn, chief engineer, International & Great Northern, on the cost of treating ties. Mr. Stimson and Mr. Schwinn seem to take opposite views as to the proper classification of this cost.

The Engineering Board of the Bureau of Valuation, Interstate Commerce Commission, during its life of 8½ years inventoried and priced ties exactly as found in the track on the date of valuation. A treated tie was "valued" as such and an untreated tie was appraised at a lower price.

The classification of investment in road and equipment of steam roads, page 18, account 8, states: "This account shall include the cost of cross, switch, bridge, and other track ties used in the construction of tracks for the movement or storage of locomotives and cars, and the cost of additional ties subsequently laid in such tracks; also the excess cost of metal ties used in repairs of track over the cost to replace in kind wooden ties removed." The classification of operating expenses, page 42, account 212, states: "This account shall include the cost of cross, switch, bridge, and other track ties used in the repairs of tracks." There is no specific reference to the cost of treating ties in any of the classifications. However, the economic principle to be followed is to charge "renewals in kind" to operating expenses. Assuming for the purpose of argument that untreated ties costing one dollar each are renewed with treated ties costing $1.50 each, there should be a charge of 50 cents to the investment account according to the general principle of economics.

It is understood that the Bureau of Accounts of the Interstate Commerce Commission does not approve charging the cost of treatment to investment where a few ties are used on each track section, for example, but where a whole division has been renewed with treated ties it is possible that the Bureau would carefully consider any case presented by a carrier and approve a charge to investment after the actual cost of treatment had been checked by a representative of the Bureau, provided that this cost was clearly in excess of the original investment.

The practice of carriers has been to charge the cost of treatment from month to month to expenses as ties are used in miscellaneous renewals and after a district, a division or the whole road has been renewed with treated ties, to take up the question of charges to investment on its merits if the case warrants further consideration.

EDWIN F. WENDT,
Consulting Engineer.

The Revision of the Transportation Act

CHICAGO

TO THE EDITOR:

In view of the present agitation for the amending of the Transportation Act, it has occurred to me that there should be a wider dissemination of information with regard to the present law and its provisions. I am therefore suggesting several reasons why this act should not be amended at the present time. These reasons are as follows:

1. If the Transportation Act is amended as proposed it will prevent the establishment of a reasonably uniform system of rates which can be worked out only through a single regulatory body having ultimate responsibility for the establishment of fair rates and adequate service. These amendments will throw the rate situation back into the confused state that existed prior to the passage of the Transportation Act, when 48 different state commissions were regulating their intrastate rates with little restraint or control. It will be remembered that at that time each state was attempting to secure an advantage over every other state by maintaining lower intrastate rates, thus reducing those rates to such an abnormally low level that it was necessary to establish much higher interstate rates to enable the roads to exist and maintain adequate service.

2. In the latter part of the nineteenth century when the regulation of interstate commerce was first given serious consideration, it was claimed that every state had the right to regulate all transportation upon the waters within its boundaries. New Jersey granted exclusive franchises upon the waters of New Jersey, and other states did likewise. The result was confusion and chaos. The only thing that made commerce between the states possible was the adoption of a uniform scheme of regulation, without which no system of transportation can succeed.

3. In the western country the farmers especially are interested in reaching the large markets. This means that 90 per cent of their traffic must move on interstate rates. If every state is to be permitted to lower intrastate rates at its will or pleasure, it means such a breaking down of the rate structure and such an inroad upon the earnings of the carriers that higher interstate rates will be necessary to make up the deficiency. These higher interstate rates will be a greater burden upon the shippers and will more than offset any advantage that may be obtained by pounding down the intrastate rates.

4. The necessity of uniform supervisory control is illustrated by the recent action of the state commissions with reference to increases in intrastate rates corresponding with the increases in interstate rates authorized by the Interstate Commerce Commission. Thirty-one states complied with the request of the Interstate Commerce Commission and granted increases in intrastate rates, while 17 states refused to grant these increases. It is only fair to the states that granted the increases that there should be some supervisory authority which would require the other states to stand their just proportion of the burden.

5. The proposed legislation will injure the credit of the roads and thereby increase the cost of securing money for capital improvements, which will of itself necessitate a higher structure of rates than now exists.

6. There is no more reason why geographical lines should determine the right to fix rates as between states than there is why geographical lines should be used to fix rates as between counties. Indeed, in many western states there are counties that are as large or larger than some of the New England states, and if each New England state is to be permitted to fix its own rates, regardless of the effect upon the country as a whole, then many of the counties in the west should be granted the same privilege.

7. Rates should be fixed in relation to industrial rather than geographical lines. If Illinois, Wisconsin, Iowa and Minnesota, for instance, insist upon fixing intrastate rates as they please, regardless of the effect upon interstate rates, they must then grant this same privilege to every other state. The result means chaos, for undoubtedly they must be uniform, and this can be secured only through the federal government.

8. An illustration of the confusion that will arise by the decentralization of authority is indicated by the recent action of the state commission of Arkansas. The Interstate Commerce Commission recently prescribed and promulgated a uniform bill of lading. The Arkansas commission has suspended this bill of lading and has ordered that it shall not apply in that state. Likewise there was a time when each state introduced its own safety appliance laws, and headlights that could be used in one state were illegal in others. The statutes are full of regulations with reference to the equipment of trains, the size of crews, etc. This resulted in such unnecessary and wasteful expenditures that Congress finally took over the whole matter and now regulates all safety appliance, train equipment, etc., with the result that standardization and uniformity have been brought about.

9. There should be no demand for a return to the old method of regulation unless the people are ready at the same time to eliminate all provisions relative to the control of capitalization and security issues, and unless the states are ready to take over and assume the financial obligations now carried by the federal government on behalf of the railroads. The federal government now fixes wages, it controls the so-called interlocking directorates, security issues, and extensions and improvements. It is fixing the physical value of the properties of the railroads, whether devoted to interstate or intrastate commerce. Certainly the states ought not to be permitted to fix the income of the railroads by the regulation of intrastate rates when the largest proportion of the expense of the railroads is left in the hands of the federal government.

10. The present law gives to the federal government only a general supervisory power over the complete structure of rates, looking to the maintenance of such revenue as is necessary to meet the expenses fixed by the federal government and necessary for the continued and successful operation and improvement of the railroads. As pointed out in the opinion of Chief Justice Taft in the Wisconsin rate case, the state commissions under the law as it now stands, have all the regulatory power over rates reasonably necessary for state purposes, and it is only when the entire general structure is such as to materially break down, burden, or obstruct the financial capacity of the carriers that the Interstate Commerce Commission may interfere.

11. There has not yet been time for the law to be given a fair trial, for the roads, the state commissions, and the Interstate Commerce Commission are only now beginning to become adjusted to the new plan.

A. C. JOHNSON,
Vice-President, Chicago & North Western.

The Locomotive Engineer as the Dispatcher Sees Him

MINNEAPOLIS, MINN.

TO THE EDITOR:

In your April 8 issue there is a locomotive engineer's letter telling us how to improve operation. His adverse criticisms reach for everyone, except the engine men. Evidently he would have the reader think that the locomotive engineer is a "Model of Perfection" and the "Czar Supreme" on a railroad. While it is true that we now have some "poor timber" as yardmasters and train dispatchers, if this engineer has had wide experience in his line of business he must realize that a very large percentage of his engineer comrades are "poor sticks."

Let one of these "would-be" engineers lose an eccentric bolt, nut, or meet with the most minor mechanical mishap;

instead of hitting the ball and squaring up to the emergency, what does he do? He tells the dispatcher he is in trouble and winds up his message with "Please advise." Many times he is unable to intelligently explain his trouble, and, when urged, will send out an "S. O. S" for another engine. Too frequently it is found that had he but used his head this unnecessary expense could have been avoided.

The ambition of the young locomotive engineer of today is not to be an expert student of mechanics, but rather to be proficient in brotherhood schedules, with their many technical possibilities, that he may be in a position to draw the biggest check with the least exertion.

I would like to see the western road which he speaks of running daily 75 trains each way, on single track. I am sure this is only a pipe dream of his, or a vision that came to him in an enginehouse discussion with his associates. It is admitted by best authority that 40 trains are about single track limit—and not 40 each way, either.

I agree with the brother that there is better feeling existing all around and that there are weak sisters in the several departments he names, but he must remember that conditions are, and have been, changing. There is no question as to his preferring old methods, when he got 30 minutes preparatory time, then used 30 minutes to eat, 30 minutes to adjust his suspenders, etc., which the company paid for—in fact, using so much preliminary time that the dispatcher would begin figuring on an engine watchman for fear the 16-hour law would catch him before he started.

If this old time loyal engineer, together with the other loyal old timers, would start an educational campaign and endeavor to instil into the minds of the coming generation of engineers the great need of most loyal and ardent support to his company, there would be less computation of punitive methods and more real railroading.

TRAIN DISPATCHER.

Some Ways to Create Favorable Public Opinion

DALLAS, Ore.

TO THE EDITOR:

Much has been printed in your columns recently concerning the attitude of the public towards the railroads and measures which might be taken to create a more favorable public opinion. I have been a station agent for many years and have been surprised that railway managements have not taken more practical and effective means to put their roads in the proper light before the public. Efforts seem to be directed primarily towards the education of the employees who come in contact with the public in the essentials of courtesy, while but little thought has been given to the removal of the handicaps under which these employees labor.

Red tape has been so increased in recent years that almost any dealing with the railroads is irritating to the public. We have storage charges for l.c.l. freight, parcel checks, stamps to cover excess value of baggage, and every sort of a method to add an extra ten cents. Charges for storage in parcel checking perhaps may be all right at large stations where every passenger is a stranger, but I do not understand why it is necessary to inflict such handicaps on the country agent. It is the practice on many roads to require those who check baggage to sign their names on a slip stating its value. This measure provides little revenue, but works injury to the roads through loss of prestige. Charges for storing l.c.l. freight at small stations have also made many enemies as have those for checking parcels.

It happens not infrequently that contracts, leases, bonds or other legal papers are sent to local agents for the patron to sign, affix revenue stamps and secure the signatures of guarantors and several outside parties as witnesses, only to discover that they are made out on the wrong form; that a new contract must be provided, new bondsmen's signatures secured and new revenue stamps provided, always at the expense of the patron. I believe that the railways should rise above these tactics and provide the revenue stamps themselves, being sure that papers are on the proper form at the first or take the consequences. Make the checking of baggage the simple operation it really is, allow their agents to look after a traveling man's grip for an hour without charging him and in many other ways remove the handicaps under which their local agents work. These agents are the best publicity mediums which a railway can have and their contact with the public should be such as to enable their dealings to be as simple and direct as possible.

J. M. CAMPBELL.

Selling the Railroads to the Public

EDGEWATER, N. J.

TO THE EDITOR:

In your discussion on "Selling the Railroads to the Public" you have overlooked the one fundamental on which rests success or failure; I refer to the employee, who is the "salesman" of any road, no matter in what capacity he is employed. True, an employee may not be engaged in actively soliciting freight or passenger business; but there are opportunities when any employee may speak a timely word in explanation of the service rendered by his road with the result that added business will be secured.

In the commercial world it is a well established fact that a salesman to be successful must be "sold" in his own product first. How many employees (salesman in the making) on our vast railway systems are sold on the merits of their own road?

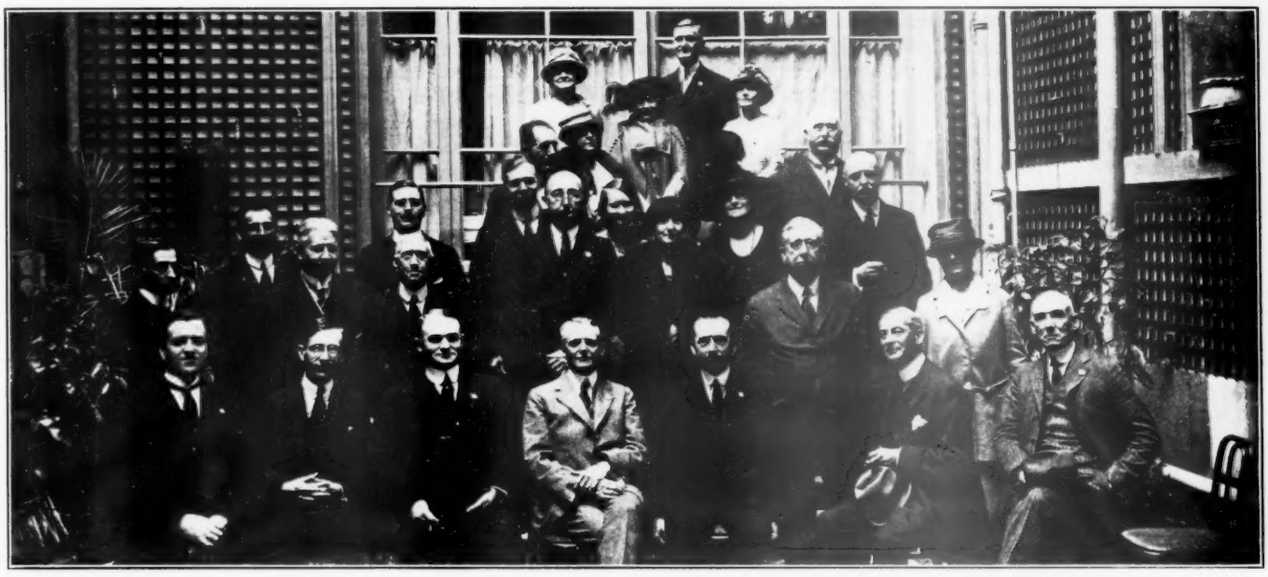
As a regular reader of one railroad employees' magazine, I believe it is both possible and practical for the railways to do constructive work on public relationships through the pages of the monthly magazines or leaflets issued to their employees. It is here that the ground work should be started in the coming movement of selling the railroads to the public.

From the viewpoint of a reader, my idea of what a typical railroad magazine should contain, is to divide the reading matter by departments, offering some constructive suggestions on how to better each department. Develop and expand certain ideas which will add to the service of the road, or effect economy of operation. As a worker in the yard service, what do I care if Bill Smith of the machine shop is visiting friends in New York? But I am anxious to know how my yard work compares with that of other yards on the line. The switchmen in my yard may be careless. It is possible that I feel I am handling more cars per day per man than other yards. But what would be the result if I read that the other fellow's damages costs were one per cent of my cost. And when any employee causes damage, who pays the bill?

When John Jones is promoted to yardmaster, don't insult him by making a simple statement of his promotion. Give him due credit by publishing his picture and an outline of his services. This makes promotion worthy of effort and inspires confidence in other workers. A foreman in any department is an important official. He has a direct bearing on net income, hence it is worth the effort to show him how to avoid wasteful methods, to make each dollar earn a dollar's return and to co-operate with other departments by a broader knowledge of general conditions, rather than a selfish desire to lighten his own load through sacrificing other departments.

The regular employees' magazine can do this work and it is the first step in selling a railroad to the road's employees so that they, in turn, will produce "teamwork."

J. G. GLAZIER.



An American Party at the Rome Congress—Reading from Left to Right from Bottom Row Upward: Eugene L. Sullivan (Worthington Pump & Machinery Corp.); Samuel O. Dunn (Editor of the Railway Age); L. A. Downs (V.-P., Cent. of Ga.); A. S. Baldwin (V.-P., Ill. Cent.); J. E. Fairbanks (Gen. Sec'y., A. R. A.); F. K. Vial (Am. Assn. of Chilled Wheel Mfgrs.); Ernest Lloyd (Am. Loco. Co.); Miss Pattison; Hugh Pattison (Elec. Engr., Ill. Cent.); Count Coruini; Capt. Priviteau (Regan Safety Devices Co.); Dr. D. Z. Dunott (Chm., Med. & Surg. Sec., A. R. A.); D. F. Crawford (Delegate of U. S. State Dept.); F. A. Poor (Pres., P. & M. Co.); Mrs. Downs; Mrs. Fairbanks; Col. L. P. Winby (P. & M. Co.); Mr. Werlich (Am. Loco. Co.); W. F. Drysdale (Worthington Pump & Machy. Corp.); Miss Tollerton; Mrs. Drysdale; Donald Rose (European Traf. Mgr., Ill. Cent.); L. G. Culleton (Worthington Pump & Machy. Corp.); Mrs. Baldwin; Mrs. Dunott; Mrs. Tollerton; Mrs. Dunn; W. J. Tollerton (Chf. Mech. Supt., C. R. I. & P.)

Rome Congress Adopts Interesting Conclusions

Next Meeting at Madrid in 1927—Reports Adopted on Electric Traction, Locomotive Improvements, etc.

By Samuel O. Dunn
Editor of the *Railway Age*

ROME, Italy, April 28.

THE NINTH CONGRESS of the International Railway Association adjourned today, after having been in session since April 18. Many of the delegates have left for their homes in countries throughout the world. A large party, however, has gone to Naples. There its members will be entertained by Thomas Cook & Sons, and by the municipality and civic organizations of Naples, with excursions to Pompeii and Mount Vesuvius and by a dinner on one evening and a special performance at the great San Carlo theater on another evening. After that most of the members of the party will proceed by ship to Genoa, whence they will go on an excursion to the electric traction installations at Modane.

The next Congress of the association will be held at Madrid, Spain, in 1927.

More Americans Participate

The closing session was presided over by Mr. Raffaelle de Corne, President of the Council of Public Works of Italy, who made a farewell address to the delegates. The deliberations of the various sections in the latter half of the Congress were enlivened by the participation of an increased number of Americans. These included Gen. W. W. Atterbury, vice-president of the Pennsylvania System; L. A. Downs, vice-president and general manager of the Central of Georgia; and Col. W. B. Causey, technical adviser to the government of Australia, all of whom were delegates appointed by the American Railway Association. Other Americans who have been here include Colonel Barber, who is serving as technical adviser to the government of Poland, and W. L. Tedford, assistant to the president of the Commonwealth Steel Co.

In French and Italian

American railway men who have not attended the Congress will naturally be curious regarding the opinion of those who have been here as to the value of attendance upon it. If they ask those who have been here, they will get a variety of opinions. In the first place, the great diversity of conditions existing in the many countries of the world necessarily has caused corresponding differences in railway practice. In carrying on discussion and framing conclusions regarding what is desirable practice, so much allowance often has to be made for differences of conditions and of history that the conclusions reached are likely to be general, indefinite and hesitating and, therefore, practically valueless. But the most salient feature of the Congress from the standpoint of Americans—and many of the English have not been in much happier case—is that much the greater part of the discussion has been carried on in French and Italian, of which most Americans could not understand a word. French is the official language of the association; and courtesy required that the language of the country in which the Congress was held should also be used; but certainly all the English-speaking delegates felt that English should have been used more. The simple fact is that much more of the world's railway mileage is operated and more of its railway traffic is handled in countries using English than in countries using

any other language. If the association is to be made of real value to railways throughout the world, it must be made truly international; and if it is to be made truly international, enough of its proceedings must be carried on in English to render its sectional sessions intelligible and interesting to English-speaking railway officers. It cannot be said that this was true of the Ninth Congress.

Differences Between American and European Practice

The differences between the practice of American and European railways are very numerous and great. In the writer's opinion, however, this should be a help, not a hindrance, to railway men of different countries in teaching each other. There is altogether too much disposition on both sides of the Atlantic to assume that because of differences of conditions American and European railways have little or nothing to learn from each other. The International Railway Association could be made the most efficient medium of communication between them; but the association will never be an important factor in this respect unless the interest in it of all the railways of the world is secured and maintained; and their interest cannot be secured and held unless the proceedings are more largely carried on in a language which the representatives of the largest single group of railways in the world can understand.

Interchange of Rolling Stock in Europe

There were two interesting reports on "Interchange of Rolling Stock." The one prepared by C. W. Crawford, Chairman of General Committee, Division II—Transportation, of the American Railway Association, dealt entirely with the interchange of freight cars by the railways of the United States. The other, which was by Mr. Charron, of the Midi (Southern) Railway of France, dealt with the interchange of rolling stock in other countries, and especially in Europe.

It is not necessary to summarize here the contents of Mr. Crawford's very interesting report, as it was intended chiefly for the information of foreign readers.

Mr. Charron's report shows that there are in effect a number of different systems of interchanging cars in Europe. One is a "convention" which went into operation on January 1, 1922, and which is known as the "R. I. V."—Regulations for the Reciprocal Use of Wagons in International Traffic. It provides that the receiving railway must after unloading, return cars without delay and, as far as possible, reload to the owning railway. Stations authorized to reload are restricted, the object being to insure the return of the car to the company owning it as quickly as possible. Any failure to comply with the conditions is subject to a penalty of 40 francs (at present about $4) from the defaulting company to the owner. Furthermore, the using company is required to pay the owning company demurrage which varies from 2½ francs a day for the first three days up to 6 francs a day beyond the fifteenth day. This agreement is in effect between the railways which use the standard gage on the continent of Europe.

There is another international convention, known by the initials "V. W. U.," which governs the interchange of cars between the railways of Germany, Austria, Hungary and the Netherlands. It differs from the R. I. V. mainly in regard to the amount of demurrage charged. It is expected that the interchange of cars between the continental railways using the standard gage will soon be subject nearly or quite universally to the R. I. V.

It will be noted that the interchange rules in Europe differ from those in the United States chiefly in attempting to compel the return of the car to the owning company as soon as possible, whereas in the United States the purpose is merely, after the car has been unloaded, to cause it to be started toward the home line. The per diem rate is the same for each day in the United States, while in Europe it is graduated upward.

The French railways have a "convention" among themselves which went into effect in April, 1920. In order to allow each railway to exercise its recognized right to the benefit of the equivalent of the cars it owns, this agreement requires that when for a period of eight consecutive days the number of cars upon a railway's lines is less than the number it owns, it may partially annul the restrictions imposed on the utilization of cars belonging to other companies in order to replenish its supply of cars. It may start home a smaller number of cars than the regulations ordinarily require, and also has the right to demand and receive a pecuniary indemnity which is made up from penalties from railways whose accounts show that they have had upon their lines more cars than they own.

Repairs to Foreign Cars

With regard to repairs to foreign cars, the principle of both the R. I. V. and V. W. U. regulations is that repairs to damaged cars must be made only by the owning company, with the exception of slight repairs necessary to make the car safe for immediate use or to enable it to be run home empty. These slight repairs are made without charge by the company which makes them.

The report also dealt with the rules covering the relations between the railways and consignors and consignees. In some countries, as in Belgium and Switzerland, the railways must comply with a demand for cars within a given time, counting from the date when the demand is made. The time allowed consignors and consignees for loading and unloading is much less than in the United States; in some countries, as short as eight hours. The French railways pay a bonus to those who load or unload cars in less than the period allowed. In Europe the proportion of freight cars furnished by consignors and consignees is much larger than in the United States. The owner of the private car is usually given compensation for its use, either in the form of a rebate per mile or by the application of lower freight rates. The railways in Belgium, the Netherlands, Switzerland and South Africa, do not, however, pay any compensation for the use of private cars.

Employees' Dwellings

There were two reports on "Workmen's Dwellings," one by A. F. Banks, president of the Elgin, Joliet & Eastern, for America, and the other by Fausto Lolli, of the Italian State Railways, for other countries. These reports disclosed a marked difference between conditions in the United States and in Europe. As Mr. Banks pointed out, American railways provide dwellings for their employees only in rather exceptional cases—usually only for section foremen or track laborers. Private enterprise usually has been sufficient to provide the houses required. In Europe this has not been the case and employees have been quite willing to have their dwellings provided by the companies. The proportion of employees of European railways lodged in buildings provided by the companies varies from 5 per cent to 17 per cent of the total number.

At the end of the year 1920 the Eastern Railway of France, which has 3,124 miles of line, owned 2,800 dwellings occupied by families of its employees, and 1,000 rooms for unmarried men, which represented an investment on the part of the company of 30 million francs. The Paris-Lyons-Mediterranean of France (6,086 miles) had spent 22 million francs on employees' dwellings. The London & South Western (1,105 miles) had 1,850 houses and cottages representing an investment of £796,000. The Italian State Railways (9,375 miles of standard gage) owned 4,677 dwellings, representing an investment of 85 million lire. As a general rule the companies assume direct responsibility for the

management and maintenance of these houses. They usually fix the rentals on the basis of actual cost, although sometimes on the basis of the average price of rents in the locality. The employees, therefore, usually get their houses for less than their neighbors. In some cases the European railways have lent financial assistance to buildings and loan associations of their employees to enable them to buy houses for themselves. Among the railways which have done this are the Norwegian State Railways, the Italian State Railways, the Paris-Orleans and the Midi of France and the Great Western of England.

Reports on Electric Traction

There were five reports on "Electric Traction." That for America was made by George Gibbs, chief engineer of electric traction of the Long Island. The other countries for which special reports were made were Holland and Great Britain, Belgium, Denmark, Sweden and Norway, Italy and Switzerland. It is somewhat gratifying to Americans to read in the report of Ernest Gerard, of Belgium, the statement that the United States "is still in the forefront for bold experiment in all directions of progress." The reports emphasize the fact that in countries or districts such as Italy and Switzerland, having numerous large waterfalls the problem of the production and transmission of the energy for electrification differs from that in other countries. It is found that in these and in the Scandinavian countries the managements of the railways are especially concerned that the energy from the hydro-electric generating stations shall be supplied under conditions which allow of its being used for general purposes as well as for traction on the railway itself. In other European countries, particularly Belgium, England, France and Holland, it has not been found desirable to adopt close interdependence between the production of current for electric traction and for other purposes.

The reporters agreed that the kind of current should be reduced to three types which can be recommended in practice for the electrification of large railway systems, viz., three phase at voltages exceeding 3,000 volts; single phase at voltages of 10,000 to 16,000 volts, and direct current at 1,500, 2,400 or 3,000 volts. It appears that single phase current at about 15,000 volts is preferred to all other types for economy in transmission, particularly when, as in Switzerland, it is carried direct in this form from the original source to the contact wire. The advantage of this diminishes where, as in Scandinavian countries, the energy must first be carried a great distance at very high voltage and reduced at sub-stations.

Mr. Gerard's summary says: "So few are the financial figures supplied and so impossible is it to compare them, that it will be sufficient to state that there has been a unanimous wish expressed in favor of the adoption of a standard form of accounts referring the different factors to the same unit. . . . . The economic advantages of electric traction are not, and perhaps will never be, sufficiently evident to justify its universal substitution for steam traction."

Bonuses

In many places in the reports and the formal conclusions reached there are references to the desirability of paying bonuses to railway employees to increase their efficiency, which are of interest to the railway men of the United States where the payment of any kind of bonus to employees is so severely discountenanced by the labor unions. For example, one of the conclusions on the subject of "Slow Freight Traffic" is that "paymnt of bonuses to the men employed in switching is of advantage in getting the best output from yards, and consequently a better turnover of cars."

Congress in Five Sections

The method of working followed in the Congress is to divide into five sections, each of which considers certain specific questions which are assigned to it. The section adopts definite conclusions which are referred to a general meeting that is held in the last days of the Congress, and at which the conclusions reached in the sections are finally passed upon.

No Action on Automatic Train Control

One notable instance in which Section III and the general meeting took somewhat unexpected action was in reference to the question of "Locomotive Cab Signals." There was a strong disposition among the French and some of the Italians, apparently, to adopt conclusions favoring audible cab signals to repeat visual roadside signals. Some delegates favored automatic train control. The report finally adopted states, "It was apparent that no conclusions could be recorded beyond the fact that the matter is in the experimental stage, and any result would have to be reported at a subsequent Congress."

Conclusions on Electric Traction

The following conclusions on electric traction were adopted:

"The Congress recognizes that at present no more than in the past, a single system could be recommended for all cases. Nor is it possible to choose between several systems, all of which have proved their value under most severe conditions of operation; the Congress recognizes, however, that these systems are all susceptible of considerable further improvements.

"The Congress agrees on the uselessness of standardization of the current in the contact wire on account of the ease with which locomotives may be changed at the frontiers of the different countries.

"It is desirable that the methods of keeping and supplying technical and economic information on electric traction should be defined and standardized, and with this in view the section suggests that this point be referred to a special committee of the association. This committee should draw up very fully the details governing each point, so that in the future as full a comparison as possible may be made by means of figures absolutely comparable."

Economical Production and Use of Steam

Superheated steam.—Superheating is universally adopted in the construction of locomotives for passenger and freight trains. It has not yet been extensively applied to suburban traffic, but the results obtained in these services have been satisfactory, especially when the smoke-box dampers, which cut off superheating when the regulator is closed, are removed. The application of superheat to saturated steam engines may be advantageously done when these are in the shops for repairs, especially to powerful engines of recent types. With the introduction of superheat, the use of two-cylinder single-expansion locomotives has increased. For powerful engines the preferences of the railways are divided between two-cylinder single-expansion with superheater, the four-cylinder compound with superheater and the three or four-cylinder expansion with superheater.

The fuel economy obtained by the application of superheat to the single expansion engines may be estimated on the average, in ordinary working conditions, to be about 10 to 20 per cent. This economy, however, is quite variable, according to the work done and the condition in which the parts are kept, and it is necessary to be more particular in this upkeep than with saturated steam engines. The special arrangements of valves and pistons of superheated engines have a tendency to become more uniform and simpler and more like those used on saturated steam locomotives. On new locomotives piston valves are exclusively used for the high pressure cylinders and packings, with sliding joints and outside cooling for rods acted on by live steam. The

area of the cylinder relief valves has also been increased. These are the only special arrangements the necessity for which has been universally recognized.

Some administrations use at the same time both inlet and air valves and by-pass. The usefulness of this double action does not appear to be yet completely established. Corliss and similar type valves and the uniflow arrangement have made no progress.

Feed water heater.—Some railways have introduced feed water exhaust steam injectors on a large scale. The results which have been obtained justify the extension of the use of these devices.

Various devices.—The trial of water-tube boilers in competition with those of ordinary type has made no progress. Those thus far made have not enabled any definite conclusions to be arrived at. Even in the most favorable cases the advantages found or anticipated in coal consumption or cost of maintenance appear to be small. There is an advantage in washing out boilers with hot water, particularly when it is necessary that they should be out of service for as short a time as possible. These washing plants with auxiliary boiler and fixed water and steam piping allowing the recuperation of the steam and water for locomotives are used to advantage in certain particular cases, especially where the cost of water is very high; but their cost and complication seem to be against their extensive use on systems where the engines have fixed bookings. Brick arches improve combustion and their use has become general.

Special Steels

The following conclusions on "Special Steels" were adopted:

Cast manganese steel with 12 per cent of manganese and 1.3 per cent of carbon gives excellent results and is economical for use in frogs. It is especially so in crossings cast in one piece. It is also advantageous for rails on curves of small radius in cases where the speed is low and the trains frequent.

Opinion is not unanimous with regard to the use of other special steels. The superiority of none of these is universally acknowledged.

Tempering rails is favored by a few engineers; the majority are against this practice except in cases where a sorbitic structure is desired.

It is desirable that experiments be continued to ascertain what are the best conditions for the use of manganese steel; to determine the actual value of other special steels and the best conditions for their use, as well as to determine the causes of the failure of rails in service.

Reinforced Concrete

The use of ordinary concrete and ferroconcrete has found a most extended field of application in all classes of railway structures. Reinforced concrete forms a more economical material than masonry or steel for many works. Works of this class include particularly bridges, foot bridges, water tanks, buildings, workshops, locomotive sheds, freight houses and overhung or extended roofs for passenger and freight platforms.

When properly designed with suitable materials reinforced concrete structures in most cases cause no greater expense of maintenance than masonry, and considerably less than steel structures. For railway underbridges which are subject to dynamic forces there appeared to be no technical reason against the use of reinforced concrete, which seems also advantageous in most cases but it requires a very close supervision in construction. It is always advantageous to lay a bed of ballast or an elastic woodplate between the track and the concrete, and it is necessary that the surface of the superstructure should be maintained in a thoroughly watertight condition.

It is desirable that the trials which are being carried out by various administrations of the use of reinforced concrete ties should be recorded.

Passenger Cars

The following summarizes the report adopted on "Passenger Carriages:"

The truck type of carriage is used exclusively in America. Its use is increasing in other countries and tends to become general for express and long-distance train service. The four-wheel truck is usually considered adequate, so long as the weight carried is not so great that the six-wheel truck becomes necessary. In England experiment has been made on articulated trains, one truck being common to two cars. This is generally applied to sections and not to whole trains. Vestibule coaches with through connections are extensively used in the U. S. A.; and are finding favor in other countries for long-distance trains. On many trains, however, coaches with side doors and corridors in some cases communicating throughout the train are used.

The use of all-metal, or nearly all-metal, carriages has developed rapidly in North America. This method of construction is now generally adopted there and is considered to reduce to a minimum the risks attendant on derailments, collisions and fire.

In Europe metal construction has not been applied to any appreciable extent, except in the case of electrified lines. On certain lines, however, steel construction is being considered with a view of reducing fire risk. It is not intended, however, to approach the weights of the American cars which have recently been incurred partly to provide additional comfort for passengers.

Lighting.—Notwithstanding the safety devices introduced into its use, gas is now, in some countries, considered to be dangerous and to be liable, if not to cause, at least to aggravate fire following a collision. Electricity, particularly for this reason, tends to replace gas completely.

Heating.—The method of heating by steam from the locomotive is becoming more and more widespread. Recent improvements have been made with the object of better insuring the flow of the steam to the last carriages of the longest trains and to allow regulating the heat in the carriages or in the compartments.

Brakes.—The use of continuous quick-acting brakes has been extended on nearly all the railway systems; trials have been carried out to increase the rapidity of action and effectiveness of the brakes on trains which run at very high speeds, and which have become of increased length and increased weight.

Oil Fuel

The following report on the use of liquid fuel was adopted:

There are no mechanical difficulties in the adoption and use of liquid fuel for locomotives. The question of cost both of the fuel and maintenance makes its use, however, prohibitive at present except in certain localities and these are so restricted that the subject is not recommended for discussion immediately. If prices should vary, it might, however, be desirable that it should receive consideration later. The question of the use of liquid fuel in conjunction with internal combustion engines on locomotives is, however, one of more general interest, and might be considered later.

Customs Examinations

In view of the vexations to which the delegates were subjected in connection with customs examinations at the frontiers of all countries (in spite of the fact that unusual courtesies were extended to them by the Italian government), it is not surprising that the Congress adopted a report upon this subject. Nobody who has not traveled in Europe since

the war can have any conception of the inconveniences, discomforts and indignities which the customs examinations of the numerous countries into which the continent is now broken up cause to be inflicted upon travelers.

The Congress recorded its opinion that "it is quite necessary to simplify customs and passport examination and also shorten the delay of the international train service at the various frontiers." It advocated the examination of baggage on trains, where possible, or at least in the immediate neighborhood of trains; that where it must be examined at stations, this should be done at the same stations for the two adjacent countries instead of at different stations.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER of cars loaded with revenue freight during the week ended May 6 showed a slight reduction as compared with the week before, to 755,749 from 758,286. This represented an increase as compared with the corresponding week of last year, when the loading was 721,722, in spite of the continuance of the coal strike, but was far below the loading for the corresponding week of 1920, which was 843,184. The principal decreases as compared with the preceding week were in forest products and ore but there was also a decrease in miscellaneous, which has been steadily gaining heretofore. Coal loading was about the same as the week before. Increases as compared with last year were shown in all districts except the Alleghany and South Western. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY MAY 6, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded: This year, 1922	Total revenue freight loaded: Corresponding year, 1921	Total revenue freight loaded: Corresponding year, 1920
Eastern	1922	9,032	3,018	8,224	1,332	5,161	2,056	70,272	82,391	181,486	.....	.....
	1921	6,558	2,668	39,626	907	5,483	2,019	57,650	64,817	.....	179,728	190,735
Alleghany	1922	1,991	2,971	12,240	4,315	2,913	2,377	49,790	66,055	142,652	.....	.....
	1921	2,188	2,961	44,078	2,370	2,195	1,410	42,854	45,901	.....	143,957	175,326
Pocahontas	1922	187	47	25,922	300	1,390	31	6,079	4,056	38,012	.....	.....
	1921	124	86	21,673	160	1,082	32	5,069	3,665	.....	31,891	32,874
Southern	1922	3,349	2,038	21,085	585	18,243	953	37,465	41,631	125,349	.....	.....
	1921	3,173	1,944	18,375	493	13,930	634	35,367	34,111	.....	108,027	129,766
Northwestern	1922	11,209	8,078	2,850	1,265	16,850	3,815	30,308	35,331	109,706	.....	.....
	1921	7,900	6,845	3,664	448	13,651	7,277	26,960	30,623	.....	97,368	137,828
Central Western	1922	10,495	11,691	3,347	151	5,693	2,096	33,105	38,403	104,981	.....	.....
	1921	10,236	10,403	13,592	166	5,334	773	30,869	31,592	.....	102,965	113,523
Southwestern	1922	3,862	2,653	1,742	176	6,882	438	15,926	21,884	53,563	.....	.....
	1921	4,526	2,413	3,866	147	6,441	649	16,517	23,227	.....	57,786	63,132
Total Western Dists.	1922	25,566	22,422	7,939	1,592	29,425	6,349	79,339	95,618	268,250	.....	.....
	1921	22,662	19,661	21,122	761	25,426	8,699	74,346	85,442	.....	258,119	314,483
Total all roads	1922	40,125	30,496	75,410	8,124	57,132	11,766	242,945	289,751	755,749	.....	.....
	1921	34,705	27,320	144,874	4,691	48,116	12,794	215,286	233,936	.....	721,722	.....
	1920	29,144	33,844	172,156	9,588	64,329	46,925	154,334	332,864	.....	.....	843,184
Increase compared	1921	5,420	3,176	.....	3,433	9,016	.....	27,659	55,815	34,027	.....	.....
Decrease compared	1921	.....	.....	69,464	.....	.....	1,028	.....	.....	.....	.....	.....
Increase compared	1920	10,981	.....	.....	.....	.....	.....	88,611	.....	.....	.....	.....
Decrease compared	1920	.....	3,348	96,746	1,464	7,197	35,159	.....	43,113	87,435	.....	.....
May 6	1922	40,125	30,496	75,410	8,124	57,132	11,766	242,945	289,751	755,749	721,722	843,184
April 29	1922	36,398	30,488	75,632	7,952	59,112	14,053	242,565	292,086	758,286	721,084	800,960
April 22	1922	33,271	28,114	63,445	7,609	55,859	9,770	239,484	276,536	714,088	704,632	717,772
April 15	1922	29,869	25,014	62,851	8,072	54,905	7,164	244,228	274,610	706,713	702,116	601,695
April 8	1922	31,598	25,024	69,456	8,599	54,680	8,259	243,718	272,934	714,268	694,881	801,559

The Car Service Division has issued charts giving a graphic picture of the extent to which car capacity was utilized in 1921 and in 1920 in loading the principal products of agriculture. These show that grain loads heavily and substantially utilizes the full carrying capacity of the cars; that flour, meal and other mill products, while physically capable of similar heavy loading, in actual practice load much below the carrying capacity; that potatoes, although susceptible to heavy loading, actually average a very light load, and that cotton, largely on account of the volume of low-density shipments, loads very light.

Particular attention is drawn to the comparison between the two years in average tons per car loaded. Wheat loading was about the same both years until the last quarter, when the loading did not reach the average attained in 1920. Corn was loaded heavier in each quarter of 1921; while oats—a comparatively light loading grain—averaged less and less each quarter of 1921, and during the last half of the year (when the seasonal demand for grain cars is greatest) dropped to a figure considerably below 1920. Other grain consistently loaded lighter in 1921 than in 1920. Flour, meal and other mill products show for the entire year a heavy loss in average tons per car loaded, and the average was lowest during the period of maximum demand for grain and flour cars. While the cause, no doubt, was primarily trade conditions, the depressed state of business inducing demand for minimum car load shipments, the resulting effect on car supply and operating costs was unfortunate. Neither potatoes nor cotton loaded at any time in 1921 as high an average per car as in 1920.

The effect of this loss in loading efficiency on railroad operating results is clearly set forth. The cars used in 1921 which need not have been used had the average loading in 1920 been maintained, run as high as 18.6 per cent of the entire movement in the case of flour and meal in the third quarter, and in the second and fourth quarters the percentage is almost as high. There was also a high percentage of cars used unnecessarily on the same basis in loading other mill products. The losses in other agricultural commodities do not run as heavy but are considerable in the aggregate.

The actual addition to operating expenses of the railroads by such reduced loading per car cannot be definitely determined, it is stated, but obviously is an important factor. All of the commodities named average a relatively long haul and the general movement is from the west and south to the east and north. That is to say, this traffic moves largely in the direction of the prevailing loaded traffic movement of the country. Such conditions inevitably involve an empty car movement in the reverse direction to return equipment to producing territory. Therefore, every car of agricultural products loaded to less than full carrying capacity increases the unproductive return empty mileage expense to the railroads. Estimating as accurately as possible the average loaded haul of the 129,413 cars that—on the basis of the previous year's performance—were wastefully used, it may safely be said, according to the bulletin, that over three million dollars were added to railroad operating expenses in 1921 by reason of these commodities alone being loaded lighter than in 1920.

A Water Analysis for the Non-Technical Man

By Cass Kennicott
Consulting Engineer, Chicago

FIGURES are of little value unless one is able to visualize their meaning easily. It is the purpose of this article to suggest a method for classifying boiler waters according to their mineral content so that the figures will have a definite and immediate meaning, fully as clear as the methods we now use for classifying locomotives.

If a railroad officer should ask about the quality of Lake Michigan water as a locomotive boiler supply he would receive the following:

MINERAL ANALYSIS OF LAKE MICHIGAN WATER

	Grains per gallon
Silica	.572
Oxides of iron and aluminum	.116
Carbonate of lime	3.913
Carbonate of magnesia	2.219
Sulphate of lime	1.051
Sodium and potassium sulphates	Trace
Sodium and potassium chlorides	.759
Total solids	8.878
Total incrusting solids	7.871
Non-incrusting solids	.759

But an analysis in this form, while perfectly clear to the analyst, usually means little to the officer requesting the information. It would be as illogical as for a master mechanic to reply to his superintendent's inquiry as to what power he had available for drag freight service by producing a certificate of analysis about as follows:

	Engine Number		
	800	810	1600
Bore of cylinders	25.141	25.270	26.081
Stroke	28.000	28.000	32.000
Steam pressure	200.000	200.000	200.000
Diameter drivers	62.731	63.051	62.880
Tractive effort	44,218.801	48,209.601	58,544.000
Etc	Etc.	Etc.	Etc.

This instead of saying, "We have two Class-800 engines rated at 1,400 tons and one Class-1600 engine rated at 2,000 tons."

There are 58,349 grains in a United States gallon. But even in this knowledge the writer has never been able to visualize a grain per gallon. Some chemists call for analyses in parts per million, or in parts per 100,000. This is very convenient for the analyst because he usually conducts his operations in the laboratory under the metric system, which gives him results in a decimal system, but it is no easier to visualize parts per million or parts per 100,000 than it is grains in a gallon. However, we are more or less familiar with the appearance and size of a pound of any given material. The average mechanical officer will make a very close estimate of the weight of ordinary bulk material and will give that weight in pounds. In other words, he is able to visualize a pound. Railroad men are also familiar with 1,000 gal. as a unit of water measure in that they have a very clear conception of the bulk of water in a 50,000 gal. or in a 100,000 gal. railroad tank, or the amount of water in a 5,000 gal. or 10,000 gal. locomotive tender. Considering that an analysis expressed in grains per gallon may be converted into one expressed in pounds per 1,000 gal. simply by dividing the number of grains given by seven, why not, for the sake of clearness, adopt this very practice?

Under this plan the Lake Michigan water presents itself as a water containing one pound of scale-forming solids in each 1,000 gal. instead of seven grains in each gallon and from this it is easy for us to see that a 100,000 gal. road side storage tank filled with Lake Michigan water holds 100 lb. of scale-forming material and that if 8,000 gal. of this water are drawn into a locomotive tender, we shall then take into the tender of the locomotive 8 lb. of scale-forming solids. In the same manner, if we are operating with water considerably harder than Lake Michigan water, say a water showing incrusting or scale-forming solids of 21 or 22 grains, we are then handling a water with 3 lb. of incrusting solids in each thousand gallons and a 100,000 gal. roadside tank will have in solution 300 lb. of scale-forming or incrusting solids. When a locomotive draws 8,000 gal. of this water it takes into the tender 24 lb. of scale-forming material.

The same logic applies to the foaming solids in the water. Statements giving pounds of solids per thousand are now frequently added as a footnote to regular chemical analyses and this is a step in the right direction, but let us go a step further and adopt the practice of expressing the analysis in pounds per 1,000 gal. in the first place and classify the information so that the railroad man can use it.

As to a suitable classification of the information, consider the following analyses showing waters which may be found in use by railroads in the middle west:

	A	B	C	D
Silica	.247	.951	Trace	1.214
Oxides of iron and aluminum	.490	.222	.164	.047
Carbonate of lime	8.971	11.875	15.344	10.465
Carbonate of magnesia	8.299	4.185	2.179	8.654
Sulphate of lime	2.047	.608	15.712	12.241
Sodium sulphate	1.329	1.616	1.869	4.265
Sodium chloride	.510	2.040	6.484	17.243
Incrusting solids	20.054	17.841	33.096	32.621
Non-incrusting solids	1.839	3.656	8.353	21.508
Total solids	21.893	21.497	41.449	54.129

Figured in pounds per thousand gallons, the incrusting and non-incrusting solids would be as follows:

	A	B	C	D
Incrusting solids	2.865	2.550	4.730	4.660
Non-incrusting solids	.263	.522	1.193	3.072

Having proceeded this far it is suggested that the analyses be expressed in a still more practical form as follows:

A	B	C	D
2.8	2.5	4.7	4.7
0.3	0.5	1.2	3.1

Here the upper figures represent pounds of scale in each 1,000 gal., figured to the nearest 1/10 lb. The lower figures represent pounds of foam-causing solids in each 1,000 gal., figured to the nearest 1/10 lb.

The question now arises as to how the information in this form can be used. An example will bring this out. Consider an imaginary short engine division with the water stations, *A*, *B*, *C* and *D* as above and assume that the locomotive draws water from each as follows:

Water station ...	A	B	C	D
Rating of water..	2.8	2.5	4.7	4.7
	0.3	0.5	1.2	3.1
Amount taken ...	5,000 gal.	3,000 gal.	4,000 gal.	4,000 gal.

Now bearing in mind that the upper figure gives pounds of scale-forming solids in each thousand gallons and the lower figure, pounds of foam-causing solids in each thousand gallons, the following simple multiplication and addition may be made:

Scaling Solids	Foam Causing Solids
A—5 x 2.8 = 14.0 lb.	A—5 x .3 = 1.5 lb.
B—3 x 2.5 = 7.5 lb.	B—3 x .5 = 1.5 lb.
C—4 x 4.7 = 18.8 lb.	C—4 x 1.2 = 4.8 lb.
D—4 x 4.7 = 18.8 lb.	D—4 x 3.1 = 12.4 lb.
59.1 lb.	20.2 lb.

Thus we find that on a one-way trip over the division the locomotive has taken 59.1 lb. of scale and 20.2 lb. of foaming solids.

Knowing the water-holding capacity of the boiler it is thus a simple matter to figure the concentration of soluble solids under any definite set of conditions and the man responsible for the care and operation of locomotives is enabled to figure blow-down, wash-out, the amount of boiler compounds to use, and in fact any other calculation except the actual conduct of a roadside water treating plant. It is not contended that the chemist should keep no other record of a water than this classification. He should keep a careful record of all analyses, but the report given an operating or mechanical man need go no further. If a complete analysis is requested the classification figures should be given first and the analysis follow as a detail.

The Aftermath of the Federal Control Period

Director General Davis Tells of Administration Liquidation Problems at Western Railway Club Dinner

THAT A GOOD FAITH effort was made by the Railroad Administration to return the properties of the railroads to their owners in as good repair as when they were taken over by the government was the conclusion drawn from the record by James C. Davis, director general of railroads, in his address before the first annual dinner of the Western Railway Club, held at the Drake Hotel, Chicago, on May 15. Mr. Davis expressed the opinion that the difficulties of the carriers attributable to federal control are economic rather than physical and suggested that the greatest need of the railroads in working out of the difficulties of their present situation is a period of legislative repose with an opportunity for a thorough trial of the present transportation act.

The meeting, which was attended by about 650 railroad and railway supply men, was also addressed by Samuel M. Felton, president of the Chicago Great Western, who briefly sketched the history of the development and accomplishments of the Western Railway Club as an organization of men interested primarily in the mechanical department, and said that the future opportunity of the club lay in the broader field of discussion of inter-departmental problems.

Address of Director General Davis

The winding up of the many and varied obligations of the government, as the result of 26 months of federal possession and operation of the railroads, presents perhaps the greatest liquidation proposition the world has ever seen. More than two years have elapsed during which this great adjustment has been in progress, and the time has now arrived when some definite opinions may be ventured not only as to when the settlement of these claims will be completed, and the amount of money that will be required to complete the adjustment, but the problems which federal control left the carriers to solve.

Up to May 1, 1922, claims had been filed by the carriers on final settlement aggregating $1,011,251,598.42. This represents, exclusive of short lines, about 95.5 per cent of the mileage under federal control. Up to the same date claims aggregating $519,798,985.18 had been settled. These settlements represent 61.22 per cent of the aggregate amount of mileage under federal control. The cash paid out by the government in making these settlements totals $146,127,-692.55.

If future adjustments proceed upon the same lines as those that have heretofore been made, the final settlements should be practically concluded by about July 1, 1923.

The Maintenance Controversy

Naturally the proposition over which the greatest difference of opinion has arisen as between the representatives of the carriers and the Railroad Administration is the question of maintenance, especially as to freight car equipment and motive power, the carriers contending that at the end of federal control their properties were returned in a greatly undermaintained condition, while the Railroad Administration contends that during federal control the individual properties were operated and maintained by the same persons who had possession of the property and who operated and maintained it during private control; that the government kept the federal managers quite liberally in funds for proper maintenance, and that, so far as was humanly possible under the abnormal conditions of a great war, the properties were as well maintained physically during federal control as they were under private operation.

In my judgment, the transportation companies suffered, as a result of war conditions, to a greater extent than any other one class of commercial property in this country, but I do not believe that this damage was the result of neglect to fairly well maintain the property.

Maintenance of Way

There was some 232,694 miles of Class I railroads taken over by the government. During the 26 months of the test period corresponding to the 26 months of federal control these carriers, under private control, expended in maintenance of way and structures $859,393,403, or $3,726 per mile of road. During the 26 months of federal control the government expended on this same property $1,533,615,734, or $6,616 per mile; that is, the government, in the maintenance of way and structures, expended $674,222,331 in excess of similar expenditures made by the carriers during the test period, and, in concluding final settlements with the individual carriers, the Railroad Administration is making just allowance for undermaintenance when the facts presented justify same. When the final settlements are concluded the government will have expended more than twice as much on account of maintenance of way and structures during federal control as the carriers expended during the test period.

Motive Power

The total number of locomotives in service December 31, 1917, was 61,890. On February 29, 1920, at the end of federal control, the number of locomotives in service was 64,983, or an increase of 3,093 units. The total number of locomotives added to the equipment during federal control was 4,226. From the best available information, during 26 months of the test period the carriers expended in the maintenance of motive power $422,244,108. During the period of federal control the government expended for the same purpose $996,877,227, or an excess expenditure during federal control over the same time of the test period of $574,633,119, the expenditure by the government in the maintenance of motive power being largely in excess of twice the amount expended during private operation.

The total number of locomotives out of service for repairs requiring more than 24 hours, on January 4, 1918, was 18.5 per cent. On February 28, 1920, at the end of federal control, the total percentage of locomotives requiring the same character of repairs was only 17.8 per cent. These records indicate a greater number of units and a higher state of efficiency at the end than at the commencement of federal control.

Freight Cars

There is much greater difficulty in comparing the condition of the freight car equipment as between the commencement and the end of federal control, largely because of the fact that in the consolidation, from an operating standpoint, of all the transportation lines the freight cars were pooled, and a large percentage of the freight equipment was during the period of federal control continuously on foreign lines.

No criticism should attach to this plan of pooling freight equipment. It was one of the necessary results arising out of the exigencies of war conditions, and was inaugurated by the Railroad War Board prior to the beginning of federal control. As a matter of fact, there was only about 44 per cent of the cars on home lines January 1, 1918, and the chairman of the Railroad War Board reported on December 22, 1917, that in the War Board's efforts at efficiency freight

cars were made to "circulate as freely over the United States as bank notes." This action was altogether commendable, and is evidence of a great desire on the part of the carriers while under private operation to meet the rising and increased responsibilities growing out of a state of war.

The total number of freight cars on line January 1, 1918, amounted to 2,374,566. The total number of freight cars on line February 28, 1920, amounted to 2,486,507. This shows an increase in the number of freight cars, as between the beginning and end of federal control, of 111,941 cars. As a matter of fact, there were built and put in service during the period of federal control 159,076 freight cars.

During the 26 months of the test period corresponding to the 26 months of federal control the total expenditure by the carriers for freight car maintenance was $391,327,170, or an average of $79.38 per car per annum. The total expenditure for freight car maintenance by the government during the period of federal control was $907,227,045, or an average of $178.40 per car per annum. At the commencement of federal control the percentage of bad order cars was 5.3, amounting to some 126,650 cars. At the end of federal control the same records indicate 5.7 per cent of bad order cars, amounting to 143,425.

I am not unmindful of the marked difference in the price or cost of labor and materials as between the test period and the period of federal control. I am fully aware of the difficulty during the time of federal control to procure at all times efficient labor and proper material. I also appreciate the insistent demands for the transportation of men and war materials, entailing in many instances unusual requirements from freight equipment, but I do submit that the expenditure by the government of these vast sums of money shows a conscientious, good faith effort to maintain and keep the carriers' property up to the same standards of efficiency as when the property was taken over.

Railroads Returned With a Deficit

It requires no profound knowledge of railroad finances to diagnose the present trouble. The serious injury to the railroad properties as the result of federal control is found in the fact that when returned to their owners the properties were being operated at a deficit, this as a result of a policy that at least a part of the increased cost of transportation should be borne by the general public as a war expense. I am not criticising the adoption of that policy; I am only suggesting its present effect.

Again, during federal control working rules and conditions were changed; labor was much more thoroughly organized; the general rule of an eight-hour day more effectively enforced, and standardized wage contracts were entered into that had not existed prior to federal control, and many other operating changes were effected in which the owners of the properties had no voice. In 1917 the average earnings per annum of each employee were $1,003.01, and a large number of employees at that time were giving ten hours per day service. In 1920 the average earnings were $1,819.71, and the average hours of service a small fraction over eight. Please understand I am not assailing the justness of these advances at the time they were made. The radical changes in living conditions and the abnormal conditions of war perhaps justified them. I am calling attention to the record and suggesting that these increases were made at a time when the carriers had no voice in the matter.

Now the railroads, upon the return of their properties, have been confronted by two very disagreeable and unpopular propositions—the raising of rates and the reducing of wages. One of the leading Senators in the United States has said, "It was just as much the duty of the government to return these roads with rates that would sustain them in their operation as it was to return them in as good condition physically as it took them."

Initiative Taken From Carriers

In solving these very controlling questions, the carriers find themselves confronted by other conditions that had not existed prior to federal control. I doubt if the general public recognizes the largely increased powers of the government as the result of the present Transportation Act, and with these increased governmental powers must go a correspondingly increased governmental responsibility.

In the matter of rates, the power to reduce charges as well as increase them is taken from the carriers. The commission is given very wide authority in the matter of permitting pooling of earnings, distribution of freight equipment, consolidation of companies, and joint use of terminals; in fact, control in the most minute details of operation is granted to the commission under this law.

The law also creates a national Railroad Labor Board. This board is given general authority to hear "and with diligence decide" disputes growing out of rules or working conditions, and is further authorized to hear "and with diligence decide" all disputes with reference to the wages and salaries of employees and subordinate officials. The Labor Board has construed its power under this act to extend to the control of all changes in wages, and that no changes in existing contracts or rules can be made by the individual carriers under its jurisdiction except upon approval of the board.

As a result of this legislation in these vital matters of rates and wages the government has definitely taken from the carriers the power and initiative to control either the income or the outgo in the operation of these properties. Much opposition to present conditions arises from a failure on the part of the people generally to understand the limited authority which the carriers have over these important matters, and also a failure on the part of the public to appreciate the vast difference between the operation of a common carrier and the operation of an ordinary private business.

Private enterprise has the benefit of the full scope of individual initiative and the exercise of discretionary judgment. Railroad operation is limited by the hard and fast rules not only of congressional legislation but of legislation of 48 states, acting independently, and supreme within their respective jurisdictions.

Private enterprises can reduce operation or altogether quit if the venture is losing money. Railroads must operate, and give the public reasonably efficient service, whether they make or lose money, and if the corporation is not able to do this a receiver, under the direction of a court, will ordinarily arrange the situation. Receiverships mean exhaustion of the resources of the property—a slow death by attrition.

Who Pays the Bill?

Another proposition that cannot be too greatly emphasized is this: Whenever the transportation systems of this country fail to function with efficiency it is the shipping public which must ultimately bear the results of inefficient and ineffective service. The commercial and agricultural interests in the end are the great sufferers from indifferent or inadequate railroad transportation service.

Again, permanent plans for capital investment, or expenditures to any large extent for deferred maintenance, require definite arrangements that consume some years of consecutive construction, with reliable assurances that the necessary funds will be available as the work progresses. If the new investment in railroad capital account most urgently demanded by the commercial and agricultural interests of the country is to be furnished, the credit of the railroads must be reasonably stabilized, and the investment in railroad securities made sufficiently attractive to invite the enlistment of new capital.

If the conditions following federal control resulted in economic injury to the railroad transportation properties as a whole, they are damages which existing laws contain no

provisions for adjusting; they are the direct result of the war, for which there would seem to be no way that money damages can be demanded or paid, being largely remote, contingent, and speculative, but they do represent conditions which the public and the law-making bodies should consider in their present and future treatment of this great business, next to agriculture the most important in this land.

A Period of Legislative Repose Needed

What the railroad interests need at this time is a period of legislative repose, a fair opportunity to work out under normal conditions permanent plans for rehabilitation, a definite time to make necessary improvements, and a reasonable opportunity, under fairly normal surroundings, to determine the merits of the Transportation Act, especially by giving the Interstate Commerce Commission an opportunity to exercise its new authority in the matter of rates, and the Railroad Labor Board a chance to exercise its new authority in the adjustment of wages.

The carriers of the United States, if given a fair chance under normal conditions, should be able to give efficient and adequate service at reasonable rates, lower than those that are to be found in any other country in the world. The people must remember that there is no legislative panacea for a situation like the present. You cannot make bricks without straw. The destroying and far-reaching effects of the greatest calamity in the history of civilization cannot be restored overnight. The painful struggle back to anything like normal times calls for patience, patriotism and forbearance, the exercise of conservative judgment, and an abiding courage.

There is one service that the transportation companies rendered in the winning of the war which should not be forgotten. At the time when the civilization of the world seemed hanging in the balance, the men operating the transportation system of America, with a wonderful and generous patriotism, responded to every call in that great movement of men, food and materials necessary to keep the armies of the Allies carrying on. America was, at the end of the conflict, the great and controlling factor. It was the railroad transportation system of this country that enabled the nation to respond so effectively. In helping that system back to a condition of commercial solvency, some generous and considerate remembrance should be had of this great achievement.

Mr. Felton Tells of Work of Western Railway Club

After briefly sketching the history of the club from its inception in 1884 as a purely mechanical department organization, Mr. Felton called attention to the broadening of the scope of the club to include officers and men of every department. This took place a little over a year ago, in recognition of the need to show the relationship existing between the various departments of the railroads as a whole, as well as the relations existing between steam railroad transportation and the public which it serves. Mr. Felton continued in part as follows:

While the Western Railway Club has been working but a short time under its more ambitious program of including all departments of railroading, the beneficial effects of its work have already been seen and felt. Every department in railroading has its place, its work to perform in connection with other departments. While very naturally every man should be thoroughly conversant with the work in which he is immediately engaged, it is necessary that those who are engaged in railroading should know in a broad and general way all that pertains to railroading and its effect upon the nation as a whole.

Railroading stands unique in its position as an industry which has practically all of its rate of return determined by the government and nearly all of its outgo similarly controlled. Without entering into any lengthy discussion as to the correctness of the theory which is super-regulating our railroads, attention should be called to the conditions under which we are operating, and railroad men should familiarize themselves with these conditions in order that the general public may learn through personal contact with the railroad man the true facts in regard to the situation.

The Problems of the Executive

Many of the members of the Western Railway Club have to do with the details of railway equipment. They appreciate very keenly the need for improvements and understand the economies that can be worked out through such improvements. It is entirely proper in their papers and discussions that they should emphasize the need of new and better equipment and show the savings which would result from such improvement.

Possibly not grasping in its entirety the problems of the executive, they may be inclined to feel that they do not always get from the management due consideration in the way of appropriations for things most evidently needed. It must be borne in mind that the railroad manager is in quite a different position from the manager of an industrial concern who is not limited by governmental action as to his rate of return or his cost of outgo. Through private initiative and resourcefulness the independent industrial manager is able to obtain not only a fair price for what he sells, but further to obtain credit so that he can install methods and equipment which lead to immediate and far-reaching economies. With the artificial limiting of the rate of return, and with the further artificially controlled expenditures of railroads, the railroad manager finds himself in a position where the control of the situation is absolutely out of his hands. The resulting effect of these conditions has left the railroad managements in a position where they are too poor to be economical. While we may see and feel the dire necessity for the purchasing of many things which would lead to more efficient operation of our railroads, those directly in charge of matters of equipment should remember that railway executives are confronted at all times with the pressing necessity of finding money enough to keep going, and the problem becomes one not only of efficient operation but one of super-management to keep operating at all.

While the railroad executives would not for a moment discourage the discussion at meetings of such organizations as the Western Railway Club of matters which would show possibilities of economy and efficiency through large expenditures for more modern equipment, it must be constantly borne in mind that our first problem is to secure a sufficiently fair rate of return so that we can get beyond the condition of a hand to mouth existence which at the present time confronts the railroads as a whole.

U. S. Chamber of Commerce Discusses Transportation

WASHINGTON, D. C.

A LARGE NUMBER of speeches relating to various aspects of transportation were presented at the various group sessions of the annual meeting of the Chamber of Commerce of the United States at Washington, May 15 to 18. At a meeting of the railroad group on May 16 presided over by George A. Post, president of the Hudson River Bridge & Terminal Corporation, addresses were made by Howard Elliott, chairman of the board of the Northern Pacific, on the regulation of railroad rates under the transportation act and by Dr. Julius H. Parmelee, director of the Bureau of Railway Economics, on the transportation act as a stage in the development of railroad regulation. At a general meeting on May 17 presided over by Mr. Elliott, F. A. Delano, former president of the Wabash and former member of the Federal Reserve Board, discussed general railroad conditions here and abroad. There were also ad-

dresses on waterway, highway and ocean transportation at other sessions and on railroad transportation in connection with meetings of other groups. At a meeting of the domestic distribution group on May 16, Charles E. Elmquist, former president of the National Association of Railway and Utilities Commissioners, discussed the effect of distribution of changes in freight rates, and at a meeting of the coal industry group, E. M. Poston, president of the New York Coal Company, discussed the relations of the transportation problem to the coal industry. Eugene McAuliffe, president of the Union Colliery Company of St. Louis, in discussing the coal strike, said that when the full importance of the relation that exists between the coal industry and the railroads is understood by the public, the proposition to regulate the development of the coal mines by withholding transportation facilities will be recognized as the only adequate and proper way that this necessary work can be done.

"As the matter now stands," he said, "a two billion dollar coal dog is wagging a twenty billion railroad dog. To put the coal industry on a sound basis, thereafter improving the railroad problem, would reflect enormously to our national advantage."

He recommended that the Transportation Act should be so amended as to require every railroad desirous of rendering transportation service to a coal mine to secure from the Interstate Commerce Commission a certificate of convenience and necessity before doing so. He also recommended a reduction in coal freight rates during the storage season.

Mr. Delano said in part:

In Europe, as here, railway builders have chafed under government regulation. There, as here, the complaint has been of "red tape." They say, as our men do, that one of the greatest objections to government regulation is not that decisions are *wrong*, but that they are so *tardy*. Because the railway is manufacturing service, which can only be used at the moment it is supplied, it follows that most railway questions must be settled immediately,—and it does not always matter so much how a question is decided as that it should be decided one way or the other instanter. A fair definition of a competent railway man might be stated as "a man who could decide the questions which arise from day to day promptly, with fairness and wisdom, and with as small a percentage of error as any other man."

If our railways are suffering because decisions are tardy, the remedy lies not in abuse of these grossly overworked federal and state commissions, but in co-operation with them by railway men and by business organizations in order to determine a solution.

Some experience with government methods here and abroad, and my observations since I have lived in Washington, lead me to think that it is not fair to call on commissions to do administrative work. If they have executive and administrative functions to perform, they ought to be authorized to act as it were "in loco parentis," or as a board of directors employing an executive to attend to those functions under their direction and guidance on questions of policy. A commission may be well qualified to act as a court in judicial or semi-judicial matters or in dealing with questions of policy; but even then, if promptness of decision is an important desideratum, much could be gained by reducing, rather than increasing, its size. I may be expressing a novel thought, but it is one I have long entertained that our boards and commissions in Washington would do better work if they were not so overloaded with routine matters and were more familiar with what was going on in the country. Although Washington is the center of our national universe, it is more detached from business and less in touch with what is going on in the country than any place I know of. And so it happens that Senators and Congressmen become professional legislators, unacquainted with what goes on in their own districts; and commissioners and board members who are appointed with a view of bringing outside knowledge to their work, soon lose all contact with home and become bureaucrats.

The interesting fact about the development of transportation in this country is that the demand for transportation increases at a rate very much more rapid than that of the population. The railway mileage, the passenger travel, the transportation of freight, all show a continuous gowth at a rate far in excess of the population. Thus we see that while our population has doubled in the last forty years, our passenger travel has increased six fold, and freight movement ten fold.

It may be suggested that this coming prospective burden upon the railways must be largely borne by the future development of internal waterways on the one hand and highways for motor trucks on the other. That railways have little to expect from such competition except in a temporary way (as happened with interurban electric roads some years ago), may be shown without digressing far. Internal waterways have for a long time possessed no economic merit except in a very few favored localities. They are usually urged by special interests in order to reduce freight rates which of course means that the many are taxed for the benefit of the few. On the other hand, such natural waterways as the Great Lakes or the Hudson River are economically of great value; but so far from being a relief to the railways, they are a conspicuous failure, because navigation is closed in the months when the cost of rail transportation is greatest and the relief would be most welcome. Our southern rivers, while free from ice, are handicapped by conditions of current or by low water stages. In brief, it may be said that a means of transportation which fails to take the peak of the load off the railways is valueless as an economic measure; and inasmuch as water transportation is never self-supporting, but an expense of the general taxpayer for upkeep and many expenses of river and harbor or improvement, it cannot be looked upon as a valued adjunct.

Dr. Parmelee said in part:

The amount which it was estimated the railways would receive from the government in lieu of net income during the six months of the guaranty period, represented about a 5 per cent return on their valuation, computed, of course, to an annual basis. The Interstate Commerce Commission has recently stated an amount which will make the rate of return less than 4 per cent instead of 5 per cent as has been usually estimated.

Since the first of September, 1920, the railways have been on a basis of rates, which, it was expected, or at least hoped, would produce a return of 6 per cent on the tentative valuation of their properties as fixed by the Interstate Commerce Commission. This provision has now been in effect for 20 months. Complete records are available for 19 of the 20 months, or through March, 1922, which show that during the four months from September 1 to December 31, 1921, the carriers as a whole earned a rate of return on their tentative valuation equivalent to 3.03 per cent when reduced to annual basis; that during the calendar year 1921 they earned 3.26 per cent; and that during the three months from January 1, to March 31, 1922, they earned at an annual rate of 4.51 per cent. Their average annual rate over the whole 19 months has been 3.35 per cent. During the 19 months they fell $784,000,000 short of earning 6 per cent on the tentative valuation fixed by the commission. In fact, the railways earned barely enough during this period to meet fixed charges.

The effect on railway credit and their ability to finance need not be emphasized here. What financing the railways have been able to do has been accomplished either through the help of the government, or through the medium of ordinary banking facilities at unusually high rates, although the situation has been improving in recent months.

What the financial situation may be during the next few months under the gradually tightening effect of the coal strike on industry, and under the modified levels of transportation rates and railways wages which may within the next few weeks, days, or even hours be put into effect by the Interstate Commerce Commission and the Railroad Labor Board, respectively, it is difficult to foresee; but an industry that even under government guaranty earns less than 4 per cent, and during a period of more than a year and a half at the highest level of rates ever experienced earns only 3⅓ per cent per year, cannot look for great improvement unless reductions in expenses can be brought about commensurate with reductions in revenue through rate cuts.

There have been many adjustments in rates during this period, most of which have been voluntary on the part of the carriers and the great bulk of which have been downward. These adjustments have covered a wide variety of commodities, including a 10 per cent reduction in agricultural products. In addition, the Interstate Commerce Commission directed the carriers in Western District to reduce the rates on grain, grain products, and hay by from 15 to 20 per cent. It has been estimated that the total annual freight revenue represented by these various rate adjustments approximates an average of about 5 per cent of the total rate level.

In the meantime, the deflation of labor in other industries has been proceeding at a more rapid pace than in the railway industry, due to the fact that a level of wages regulated by government supervision changes more slowly than wages subject to competition in the open market. This in turn has tended to postpone or delay rate reductions which might otherwise have been made, in sympathy with the general deflation in the price levels of agricultural commodities and manufactured products.

It will be perceived from this brief summary that our experience with the Transportation Act of 1920 has not yet been sufficiently extensive to offer a conclusive test of the effectiveness or the wisdom of its several provisions.

Some Notes on Railway Refrigerator Cars*

Requirements for Efficient Refrigeration; Importance of Air Circulation and Insulation

By W. H. Winterrowd
Chief Mechanical Engineer, Canadian Pacific

THE SUBJECT of railway refrigerator cars has been, and is still one of growing importance, a growth that has been contemporaneous and proportional to the development of the United States and Canada and their communities, and to the resultant demand and necessity of transporting increasing quantities of perishable commodities greater and greater distances. When hauls were short and the variety of perishable commodities few, the problem of transporting and protecting the commodities from heat or cold was comparatively simple. Increasing distances and a greater variety of perishables not only made necessary greater numbers of, and more efficient cars, but involved the establishment of railway-divisional and terminal facilities, upon

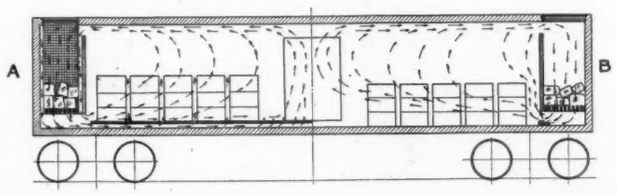


Fig. 1—Diagram of Air Circulation

which the successful operation of this type of equipment is contingent.

Comparatively speaking, literature upon the subject is not vast, although exceedingly valuable. Finding the sources of information to some extent scattered, the writer has attempted to include under one heading some of the most interesting and important facts regarding principles and methods involved, as well as to present some information regarding the type of cars and methods of construction used by various railways and private-car owners.

Refrigeration of Commodities in Transit Involves Many Factors

The prevailing method of obtaining refrigeration is by means of naturally-circulated air, cooled by contact with ice, or ice and salt, placed in suitable receptacles called bunkers located at each end of an insulated car. Some modifications of this system will be touched upon very briefly later.

Circulation is assisted and made most efficient by means of insulated partitions, called bulkheads, placed in front of the containers and so constructed that the relatively warm air must pass over the top of them to reach the ice, or ice containers. The air becoming chilled, and therefore heavier, sinks toward the floor and reaches the body of the car by passing through a space beneath the bulkheads.

These insulated partitions also assist in protecting the lading nearest the ice containers. Without bulkheads, and when salt is used with the ice to hasten and increase refrigeration, that part of the lading nearest the ice frequently freezes, an undesirable and disastrous occurrence with some commodities. At the same time, that portion of the load near the center and top of the car may remain at too high a temperature, an equally undesirable condition.

As a further aid to circulation, particularly in cars where the lading is piled or stacked, a slatted wooden structure known as a floor rack is of very great value. These racks, on the top of which the lading may be placed, consist of longitudinal runners 3 or 4 in. high, with cross slats fastened to the top of them. They are hinged to the side walls of the car and are divided in the middle so that they can be turned up to make the floor accessible. These racks permit the cold air which flows beneath the bulkhead to circulate freely toward the center of the car and up through the lading.

Illustrations of Effect of Design

The *A* end of the car, Fig. 1, shows the relative arrangement of bunkers, bulkheads and floor racks, and the resultant trend of air circulation.

It is highly desirable that there be no obstruction to the flow of cold air where it passes beneath the bulkheads. The *B* end of the car, Fig. 1, shows how an obstruction at that point can act as a dam or deflector of the air currents, and partially or entirely defeat the object of the floor racks, and

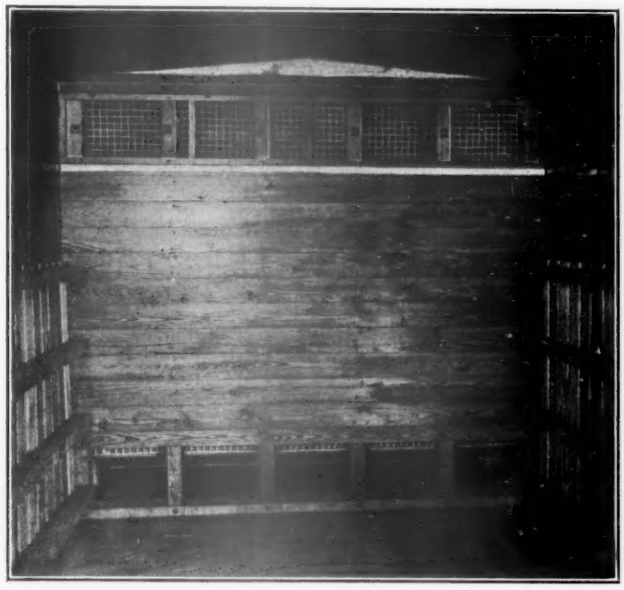


Fig. 2—Car with Fixed Bulkhead and Basket Bunker, Floor Racks Raised

even cause frosting of the lading against the insulated bulkhead. If floor, bunker or splash-board construction necessitates a ledge beneath the bulkhead, it should be kept as low as possible and the floor rack and bulkhead so designed to provide sufficient area for a free flow of air.

At the *B* end the lading is shown piled directly on the floor and the air currents indirectly indicate the advantage of floor racks. Fig. 2 illustrates these racks, showing their appearance when turned up against the side walls.

The method of loading various commodities is an important factor in their proper refrigeration in transit. To obtain the greatest advantage from circulation, the contents of the car should be loaded so that the air can come in contact with

*From a paper presented before the American Society of Mechanical Engineers at New York, May 16, 1922.

a maximum surface with a minimum of restricted circulation. It is easy to understand that boxes or containers, placed closely against each other and against the walls of the car cannot be cooled quickly or properly preserved at as uniform a temperature as when placed so that air can flow between them, or generally speaking, throughout the entire load.

The temperature of the circulating air is affected by the type and size of ice containers or bunkers. The chief considerations in the construction and capacity of the bunkers are the refrigeration required to replace the loss due to transmission and the refrigeration required to cool the car quickly and maintain its contents at the required temperature. The loss in transmission in turn depends upon insulation, car construction and maintenance; factors which will be more fully discussed later.

A basket bunker is shown in the *A* end of the car in Fig. 1, and a box bunker in the *B* end. Brine tanks are shown in Fig. 3.

The sides of the basket bunker are constructed of wire mesh. The bottom consists of a slatted wooden structure. The bunker is placed in position so that air space exists around the outer surfaces, this construction permitting the air behind the bulkhead to come in contact with a maximum ice area, while the open spaces around the bunkers facilitate circulation.

The bottom of the box bunker shown at the *B* end of the car in Fig. 1 is also slatted. The walls are formed by the bulkhead and by the sides and end of the car. In an endeavor to make the refrigerator car more productive and useful for general purposes, some builders have applied collapsible box bunkers. In this design, the bulkhead is

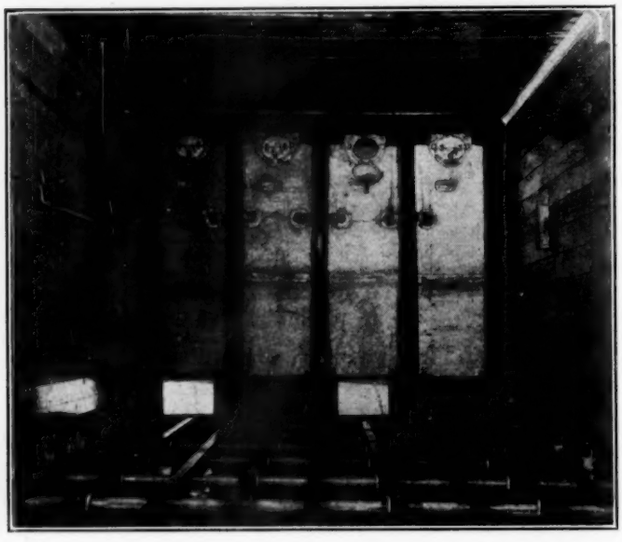


Fig. 3—Brine Tanks in Refrigerator Car, Bulkhead Swung to Side

swung up, or to one side, and fastened. The slatted rack is swung or folded back against the end of the car. In this way the space occupied by the bunker is made available for general lading.

Another very important factor is the size of the car and its proportions, particularly with reference to the distance between the bulkheads. The cold air passing out beneath these insulated partitions flows toward the center of the car. In doing its work it gathers heat and grows warmer. If the distance between bulkheads is too great, the air may not be at a low enough temperature when it reaches the center of the car to properly refrigerate the load at that point, particularly near the top of the car. Under such conditions a portion of the load near the bulkheads may be sufficiently chilled while the upper and center part of the load may be too warm. The chief factors generally considered in this connection are type and capacity of car, type of bunkers, amount of commodities and size of containers, and temperature required for efficient refrigeration.

Importance of Temperature of Entering Load

The temperature of the entering load is a very important factor. If heat is not removed from certain commodities prior to loading it is highly desirable to remove it as quickly as possible after loading. Tests and general experience show that if the heat is not promptly reduced, the commodities either spoil en route or reach their destination in such condition that their market value is greatly reduced. Quick cooling after loading is generally attempted by pre-cooling

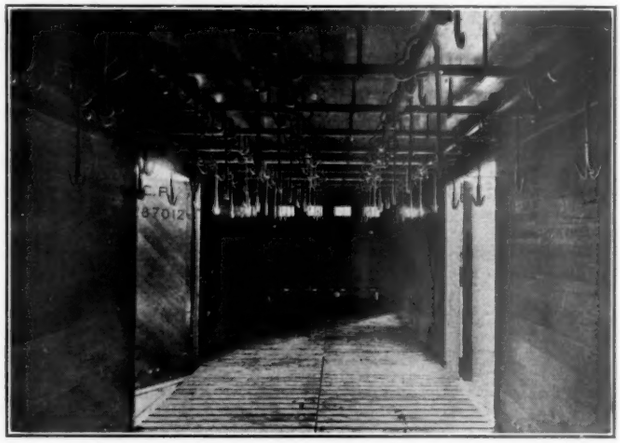


Fig. 4—Meat Rack and Hook Installation

the car, by the use of cars in which maximum and most efficient air circulation can be obtained and by mixing a proper amount of salt with the ice or by placing coarse rock salt on top of the ice.

When salt is mixed with the ice, the greatest amount is used at the first icing, the time when the greatest quantity of heat is in the lading. At the second icing the amount is generally reduced, while at the third and successive icings a stipulated minimum amount is used.

Pre-cooling the car may be accomplished by the use of ice and salt, but at many points where a large tonnage of fruit or meat originate, the cars as well as the lading are often pre-cooled by mechanical means.

Pre-cooling means less ice in transit, a matter of economy to shippers and railways alike. Some commodities can be frozen hard and therefore require little or no icing en route, the lading itself supplying the necessary refrigeration. This not only insures better condition in transit but is an added economy.

Humidity or moisture content of the air in the car is almost as important as temperature. Generally speaking, if refrigeration is effective and a high initial rate of cooling obtained, the air is kept sufficiently dry due to condensation taking place on the surface of the ice, or ice containers. In this way the moisture given off by some classes of lading is also deposited. Excess of humidity, if not fatal, is highly injurious to many commodities.

Insulation Is the Most Important Consideration

Finally we come to the matter of insulation, the most important factor in connection with efficient and economical refrigeration. The function of the insulation is to afford protection to the lading by minimizing heat transmission through the walls, roof, and floor of the car. To do its work properly it must be by nature a poor conductor of heat.

Other desirable qualifications are reasonable cost, strength, adaptability, durability, light weight, and imperviousness to moisture.

This subject might well be divided into two parts, insulating materials and insulation, because the general subject involves methods of car construction and maintenance in addition to the consideration of materials and principles of heat transmission.

The whole subject is capable of analysis but that the principles involved are not broadly known is indicated by the fact that in very recent years cars have been built without proper or sufficient insulation. These cars which do not properly protect their lading are huge consumers of ice and expensive to operate and require a great deal of maintenance to keep them in service.

Summation of Requirements for Efficient Refrigeration

It is evident that an efficient and economical railway refrigerator car is one which provides adequate air circulation, adequate protection to the lading, adequate quantity and degree of refrigeration, quick initial cooling, uniform temperatures, dry air, space to permit proper methods of loading, and good car construction to minimize maintenance and increase time in service.

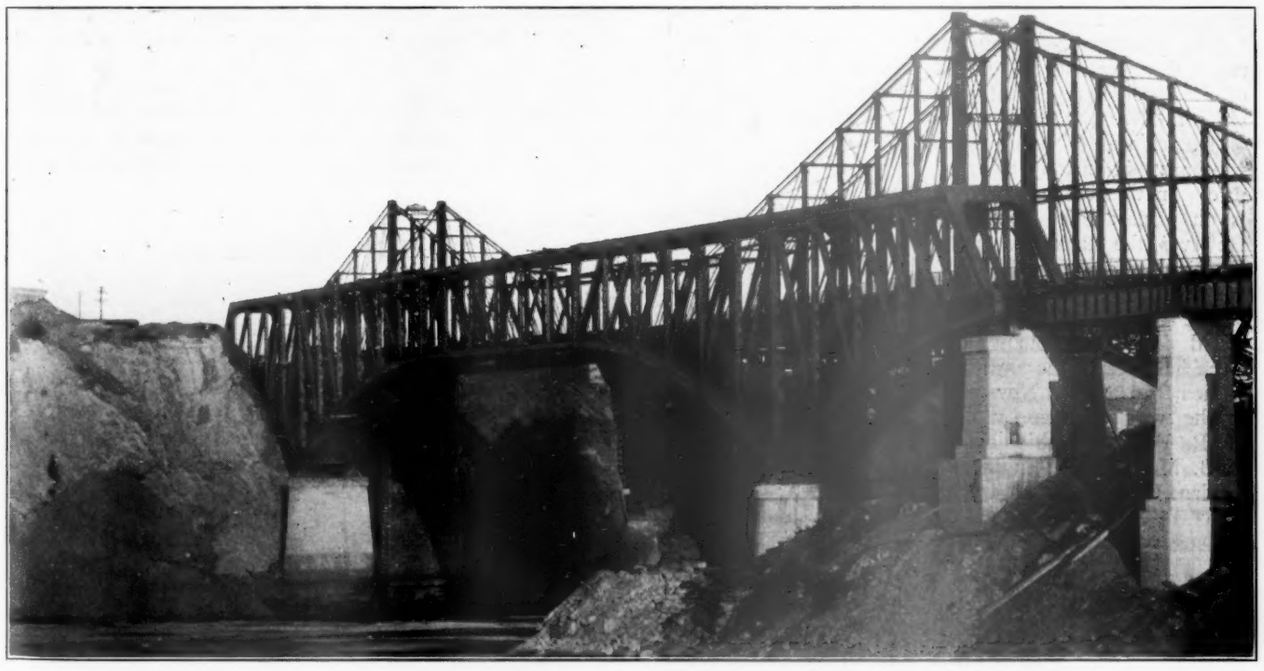
(An abstract of the remainder of Mr. Winterrowd's paper will be published in the next issue.—EDITOR.)

New Cantilever Bridge Replaces Famous Old Span

Canadian Pacific Completes a New Structure Over the St. John River in New Brunswick

ONE OF THE MOST IMPORTANT railway bridge projects completed during the last year was the new cantilever bridge over the St. John river at St. John, New Brunswick. This is a single-track structure with a main span of 450 ft., center to center of piers. No little interest is attached to this structure because of the unique character of the site at the narrowest portion of the St. John river gorge, a short distance from the point where the river flows into the Bay of Fundy. With a tide variation of 22 ft. at the site of the bridge, terrific tidal flows are set up which have resulted in the phenomenon, known as the "Reversing Falls." This condition precluded the use of any form of construction requiring falsework. The completion of the new bridge marked the passing of one of the famous bridges on the American continent, which excited a great deal of comment at the time of its construction in 1884 and 1885, owing to the fact that it was very much similar to the Niagara cantilever completed in December, 1883, the original St. John Bridge having a span about seven feet longer than the Niagara bridge.

The crossing of the St. John river carries the Canadian Pacific to its eastern terminus in the city of St. John, New Brunswick. The original bridge was built by the St. John Bridge & Railway Extension Company and served to connect the Intercolonial with the St. John & Maine Railway at Fairville, N. B. The bridge and railway were purchased by the Canadian Pacific and incorporated into that system in 1905. The construction of the original bridge was a matter of great importance since it afforded the first direct rail connection between the New England states and Nova Scotia, the current condition in the river making the use of car floats out of the question.



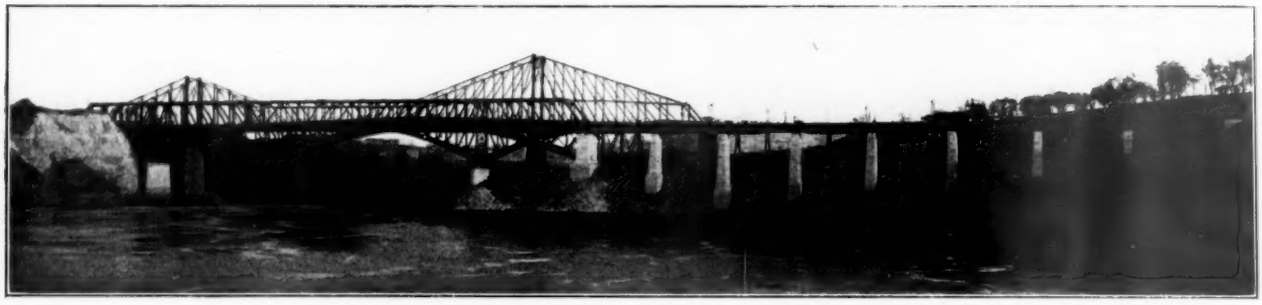
Three Interesting Bridges Span the Gorge at Its Narrowest Point

The new bridge comprises the cantilever bridge proper and a viaduct composed of eight 70-ft. deck plate girder

spans on concrete piers, forming an approach from the west. The cantilever structure consists of two anchor arms, 125 ft. each, two cantilever arms of 150 ft. each, and a suspended span of 150 ft.

The anchorage at the east and required excavation in solid rock, while a concrete pier was built for the west anchorage. This west anchorage pier was designed with two pre-moulded shafts, into which the steel anchors were entered and later sealed up with concrete.

The two main or river piers are founded on the rock below low water level on which a satisfactory foundation was obtained. These piers are constructed of concrete, faced with granite from the base up to high water elevation and finish about 43 ft. over the surface of slack water. All four piers of the cantilever bridge have rock foundations while of the approach piers, two are founded on rock and the remainder on hard pan.



The New Bridge Is Flanked on the West by a Viaduct of Eight Deck Girder Spans

The photographs bring out the essential difference between the new and the old cantilevers. Both structures are of the through type, but whereas the bottom chord of the old cantilever was horizontal and the variation in the depth of trusses was taken up entirely in the top chord, the arrangement is entirely reversed in the new cantilever structure. In this the top chord is level and the bottom chord is on a parabolic curve each way from the main piers. However, the suspended spans in both structures have parallel bottom and top chords. The third structure seen is a 565-ft. highway arch.

The substructure was commenced in April, 1920, and completed in the following December. The steelwork was erected between June and October, 1921, and the bridge was opened for traffic on November 24, 1921.

The work was done under the general supervision of J. M. R. Fairbairn, chief engineer for the Canadian Pacific, P. B. Motley being engineer of bridges and C. F. Draper, resident engineer on the work. The contractors for the substructure were the Foundation Company, Limited, and for the steelwork the Dominion Bridge Company, Limited.

Black Diamond Express Derailed by an Automobile

THREE PASSENGERS and an employee riding as a passenger were killed, and 33 passengers injured, on train No. 10, the eastbound Black Diamond Express, of the Lehigh Valley, on Saturday morning, May 13, at North Leroy, N. Y., 47 miles east of Buffalo, when the train struck an automobile at a highway crossing and was derailed. The train was running at about 65 miles an hour and three coaches fell down a high bank and were overturned; but the locomotive and mail car kept to the roadbed. The occupant of the automobile was killed. He was traveling northward. The region is level, there was a clear view from the highway for more than a mile; and the engineman saw the automobile half a mile away and sounded the whistle continuously to the crossing; and there was a visual and audible highway signal at the crossing. This was in good working order after the accident; and, moreover, a brakeman of a westbound freight which had just passed the crossing testified that he heard it ringing after his caboose had cleared the crossing. The highway crosses the tracks at a right angle.

All the cars of the train were of steel.

The immediate cause of the derailment appears to have been the entanglement of the engine of the automobile in the pilot of the locomotive, the mass being pushed along on the rails for about 300 ft. to a crossover track, where it caught in the frog and was forced under the wheels of the locomotive.

The man in the automobile, said to have been a farmer, 65 years of age, appears to have stopped a little distance short of the crossing to wait until the freight train should have cleared the highway; and but for the fact that the freight was north of the passenger train the explanation of his negligence would be expected to be found in the circumstance, often reported in crossing accidents, that the passenger train was hidden from him; but as a matter of fact he seems to have had both a visual warning and an audible warning—a plain view of the passenger train for a mile to the west of the crossing, and the long continued sounding of the whistle (assuming that he was not deaf); and the fixed crossing signals (the well known Hall enclosed-disk) are in duplicate, one on the south side of the tracks and one on the north side.

P. & A. Photo

Derailment on the Lehigh Valley

Railroads Have Profited from Development Work in Nebraska.

Development Association Holds Annual Convention

Addresses by Distinguished Guests and Lively Discussions Are Features of Denver Session

THE fourteenth annual convention of the American Railway Development Association, comprising representatives of the agricultural, colonization and industrial interests of the railways of the United States and Canada, met at the Brown Palace Hotel, Denver, Colorado, on May 10, 11 and 12, with President Geo. E. Bates (Delaware & Hudson) in the chair. An address of welcome was tendered the association by Hon. Oliver H. Shoup, governor of Colorado. Addresses were also made by H. R. Safford, vice-president, Chicago, Burlington & Quincy; C. A. Lowry, president, Colorado Agricultural College; A. A. Reid, chairman, Colorado Committee, War Finance Corporation; Prof. James Underhill, Colorado School of Mines, and others.

Mr. Safford Discusses New Railway Era

"While railway development work has been valuable to a large degree in past years, I believe you are entering upon the period of greater possibilities," said Mr. Safford. "We are entering upon a period which is both reactionary and progressive—reactionary because of the rebound from a violent and destructive action beginning in 1914, and progressive because of the many new and unsolved problems suddenly developed. Conspicuous among the new conditions affecting the railroads are the greatly disturbed rates of exchange in foreign countries, causing cross-currents and reversals of the accustomed flow of traffic, the Panama Canal as a strong competitor of inland railway routes, the encouragement given to the establishment of inland lake and river routes, and the development of highway motor traffic facilities. Such conditions, coupled with the fact that railway expansion in terms of transcontinental mileage is practically at an end, makes the present problem one of developing and protecting the present mileage rather than one of enlarging it. The problem of meeting waterway and motor car competition is largely one of developing more traffic which can be handled only by rail. Your principal duty is to help find resources and to help show how to develop the maximum possibilities in them.

Mr. Safford pointed out the great opportunity of the association in the establishment of a better understanding of the railway situation by the public.

The agricultural section was opened by the presentation of an illustrated lecture by E. O. Fippin, general manager, National Lime Association, Washington, D. C., on agricultural limestone and its relation to agricultural production and railway traffic. In the discussion of this paper emphasis was placed on the value of this promotion work from a railroad viewpoint. Traffic had been appreciably increased through the use of lime along the lines of the New York Central; the effect of its use for agricultural purposes is not only to provide an increased traffic from enlarged crop yields, but also by the shipment of the limestone itself.

The Interest of Railways in Reclamation

Taking as his subject the status of national reclamation legislation in the United States, R. E. Shepherd, chairman, Western Reclamation Association, Jerome, Idaho, presented figures to show that in 1921, 242,000 tons of freight were shipped out of the Boise, Idaho, development region and 261,054 tons of freight received. Mr. Shepherd also showed how studies had developed the fact that traffic between the east and the irrigated west, amounted to more than the entire trade with any foreign country except Great Britain.

Jesse Jones (S. A. L.), led the discussion on this subject by presenting a paper in which he outlined the progress in reclamation from its inception in 1890, down to the present time, giving particular attention to the character of the various bills presented to Congress and the problems encountered in securing proper legislation. Mr. Jones supported the Bankhead-Borah bill now awaiting final action by Congress. There are yet unreserved he showed, 200,000,000 acres in the public domain of which 20,000,000 acres are known to be susceptible to reclamation by irrigation; and in all there are over 350,000,000 acres of drainable and cutover lands which are reclaimable. As against this, approximately 58 per cent of the country's population does not own real estate of any character, a condition which has a tendency to make for irresponsibility on the part of citizens.

Advertising in Development Work

The importance and value of general and specific advertising in development work was set forth in an address by F. D. Zimmerman, vice-president, Eleventh District Associated Advertising Clubs of the World, Denver. After tracing the development of advertising from its origin to the present time, Mr. Zimmerman stated, "that advertising is today the mightiest factor in the business world, including the railroads." As to the interests of the railroads in this

matter, public relations, he said, is one of the most important subjects to be considered at the present time. In the same way that laws can be made or unmade by moulding public sentiment. So advertising should receive immediate and close attention by the railroads by reason of the possibility presented to overcome unfavorable public sentiment. In supporting any policy of advertising, however, Mr. Zimmerman pointed out the necessity and advisability of its continued application.

Correct Practice in Colonization Work

A paper on the subject of immigration and colonization was presented by J. H. Jasberg (D. S. S. & A.).

"My experience," Mr. Jasberg said, "has been that the bona fide settler is a strong and sturdy laborer and wage earner with a large family, such as are to be found in mines, factories and other industries. The interest of the wife is essential to the success of the colonization venture on the part of such men. The northern European is best suited to become a settler in the northern countries. The land should be suited to the kind of farming that the prospective settler intends to practice and should be advantageously located as to roads and schools. The land should also be reasonably priced, with attractive terms of payment, and when extraordinary difficulties arise, the agent should be ready to assist the settler in surmounting it.

Proceedings of the Industrial Section

The industrial section of the association, except when in joint session with the agricultural and marketing section, devoted its time to the consideration of the various details involved in connection with sidetrack contracts, the practices of the roads regarding the maintenance of private tracks, the effect of the proper handling of maintenance charges where team tracks or other railroad owned tracks are extended for private industrial use, the effect of fire indemnity clauses on insurance rates, and a detailed discussion of shippers guides. In order to obtain information as to the practices of the various railroads relative to shippers' guides a questionnaire was sent to 65 railroads and of the 32 replies received, 17 of the lines have shippers guides. Three of these roads issue annual guides. Two issue guides every three or four years and others at irregular periods. On eleven roads, the work of issuing and preparing the directory is carried out under the direct charge of industrial or development departments, while on nine, the work is under the traffic department. The returns also show that seven of the roads compile and issue the directory with their own forces, while eleven others leave the work to advertising companies and two handle it jointly with advertising companies. Twelve roads secured the data by sending questionnaires to their local agents, while two leave the matter entirely to advertising companies handling the work and one handles the entire matter with its own forces. As the result of this study, the committee recommended that all roads should issue industrial directories to promote closer relations between shippers and receivers of freight, also that the directory contain only actual receivers and such other information of value to them as the list of railway officers, schedules of manifest freight trains, location of stock pens, track scales, and stations and a general map of the territory. He recommended also that no advertising should be displayed in the directory and that the loose leaf form of directory is not practicable.

St. Louis, Mo., was selected as the location for the next convention. The following officers were elected for the year: President, J. B. Lamson, agricultural development agent, Chicago, Burlington & Quincy; first vice-president, John F. Fox, traveling immigration agent, Northern Pacific; second vice-president, J. F. Jackson, agricultural agent, Central of Georgia; secretary, A. Leckie, industrial agent, Kansas City Southern.

Rate Decision Still Uncertain

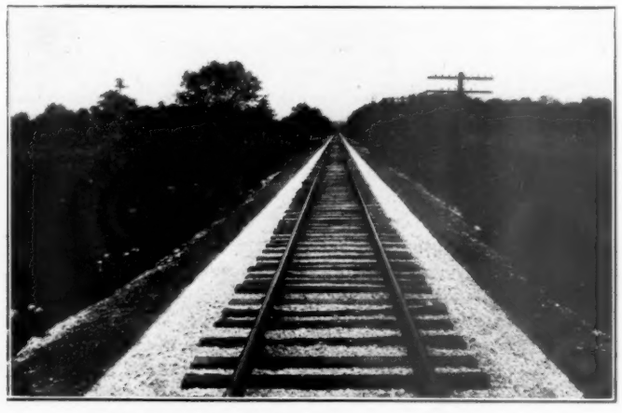
WASHINGTON, D. C.

ALTHOUGH the Interstate Commerce Commission was supposed to have reached or practically reached a decision in the rate case several days ago, it had not been made public by Wednesday evening and it was reported and believed in some quarters that it had been held up at the request of the President until after his conference with railroad executives at dinner at the White House on Saturday, May 20.

The commission had a conference on the rate case on Saturday afternoon, May 13, and it was expected around its offices that the report would be made public at any time, but, according to reports, the President sent word from Atlantic City, where he was spending the week-end, asking that it be withheld until after his return. On Monday, Chairman McChord was at the White House twice but declined to comment on the purpose of his call and the President, at his conference with newspaper men on Tuesday, declined to shed any further light on the purpose of his invitation to the railroad executives to discuss the railroad situation. Commissioners Esch and Cox were also at the White House on Monday and it is understood the commissioners have had further conferences among themselves during the week.

While nothing authoritative has been given out, the story generally believed in Washington is that the President, anxious to have his administration do something big to improve economic conditions, and having been informed that the commission was unlikely to agree on a very pronounced program of rate reductions in view of the fact that the railroads have not yet attained what could be called a fair return, determined to call upon the railroad executives to do voluntarily, with public credit to themselves and to himself, more than they could be forced to legally by the commission. It is suggested in connection with this story that the President believes he can accomplish more with the railroads by giving them an opportunity to reduce rates without an order but there is also another theory that he would not be able to talk very strongly without a decision before him and that the delay is merely due to many differences of opinion among the commissioners in putting the finishing touches upon a report.

In view of the well known position of the railroads that rates should not be reduced until expenses have been reduced by a further reduction of wages by the Railroad Labor Board, there has been some curiosity as to what the President may have up his sleeve and what kind of arguments could be put up to them to reduce rates voluntarily by a greater amount than the commission could find warrant for ordering.



A Well-Maintained Tangent on the W. & L. E.

A New Plan for Unified Terminals at Chicago

Report Made for National Association of Security Owners Favors Joint Operation

A NEW PLAN for the joint operation of railway properties in the Chicago terminal district has just been made public in the form of a report by the Board of Economics and Engineering of the National Association of Owners of Railroad Securities. It comprises one feature of a general plan on the part of the association for a study of railway operation, having in mind the possibilities for increased economy and efficiency. Chicago was selected for this study as being fairly representative of the situation found in inland terminals throughout the country and the plans proposed for its improvement are submitted as being applicable elsewhere. An abstract of the report follows:

It is the purpose of this report to suggest plans and methods whereby the fundamental principles that should cover the operation of terminals in large cities can be applied so as to reduce the cost to the carriers of moving a revenue ton and improve the service to the shippers. The recommendations of the Chicago Terminal Commission, generally referred to as the "Wallace Plan," have been accepted by the board for the section of the downtown district to which they apply and as the basis for the extension of the same principles to the entire Chicago district.

Traffic Handled Is Large

The freight traffic in and out of Chicago each day consists of about 27,000 cars. Of these, 54 per cent, or about 14,600 cars, is through business; that is, freight merely passing through Chicago on its way to other points. The remainder, about 13,400 cars, less than half of the total, is local business; that is, freight of Chicago origin or destination.

The tracks required to handle this heavy volume of traffic constitute a network that has come to interfere seriously with commercial and industrial growth, to impede street traffic, and even to restrict the expansion of railway facilities. While some of the trackage is operated in common by several roads, each line has its own yards and terminals, and receives and interchanges freight on an individual basis.

Competitive methods increase the train miles necessary to handle the business, for when deliveries are made at interchange points, the road to which a car is destined must send a locomotive and crew to make the transfer to its own road, frequently requiring an all-day run to make the transfer of a single car. While this is an extreme case, nevertheless the number of light movements and the duplication of effort result in short trains and heavy train mileage.

The principles on which the roads now operate are:

1. Individual competition with the temptation of adding unnecessary train mileage to obtain special business that is of temporary advantage to that particular road.
2. Interchanging at stated points of which there are at least 80 on and inside the Indiana Harbor Belt.
3. Transfer of c. l. and l. c. l. cars from one road to another by means of transfer and connecting railroads.
4. Transfer of through l. c. l. shipments through downtown freight houses and the city streets.
5. Capital expenditures made to suit individual roads without reference to co-ordination.

The total average business in and out of Chicago daily is:

Freight houses	4,580 cars
Team tracks	1,636 cars
Industries	6,027 cars
Through business	14,488 cars
Total	26,731 cars

In the area bounded by the Indiana Harbor Belt and the cities of Gary and Evanston, there are 12,982 tracks with a total strength of 4,389 miles, of which 871 miles are elevated. During the federal administration a "co-ordinating committee" of railroad officers was appointed, whose duty it was to co-ordinate the traffic in Chicago, particularly the through business, in such a manner as to make the best use of the facilities available and to divert as much traffic as possible away from the congested districts. As a result the Indiana Harbor Belt began to function as a "belt line" and facilities were developed along that line. After the roads were turned back to the owners, this operation was continued, in a modified way, with the result that at the present time part of the business is going around the city and at some points l.c.l. business for points outside the city is being consolidated for movement around the city instead of transporting it from one downtown freight house to another through the city streets. About 25 per cent of the through business is being handled around the city at the present time.

Proposed Improvements and Method of Operation

The plan of the board is to divert all through business around the city. All cars into and out of Chicago are to be collected in group yards along the Elgin, Joliet & Eastern, which is to be used as an outer belt. It is proposed to eliminate all interchange points; to eliminate transfer and connecting railways; to eliminate all freight yard and equipment facilities not needed for switching and passenger service. All through cars are to be transferred from group yard to group yard, and all improvements are to be made along this outer belt where they may be considered permanent until, after many years, the city's growth again requires a rearrangement.

It is proposed to use the Indiana Harbor Belt as a temporary belt line for transferring from the southeasterly group to the northerly group until it becomes necessary to devote it to other purposes on account of the growth of the city. Normally the movement between group yards will be in full trains, and generally cars will be made up in full trains for the receiving road. So also will the city business leave a group yard in full trains for distribution after delivery to an industrial switching yard, and the makeup of trains leaving an industrial yard can readily be made so as to require the minimum of switching after delivery to the group yard.

Less Than Carload Freight

Each group yard will have transfer platforms where all l.c.l. cars may be consolidated for the city and for foreign lines. By this means about one-third of the l.c.l. cars can be released in the group yard and the balance taken into the city in ordinary or specially designed cars in full trains.

Less than carload freight for Chicago and points beyond the city is now delivered in cars loaded to an average of about seven tons each. Of the l.c.l. cars going downtown approximately 600 cars containing over 4,000 tons are for out-of-town points. At present part of this is being transferred around the city but the greater part of it still goes through the city streets.

There are at present about 28,000 tons per day, or about 10,000,000 tons per year of l.c.l. freight coming in and going out of the city which costs the railroads:

	Per ton
For operation	$1.77
For property value—fixed charges	1.08
Total present cost	$2.85

The plan herein contemplates a reduction of this figure as follows:

	Per ton
Reduction of fixed charges under Wallace plan ($40,000,000 at 6 per cent, divided by 10,000,000 tons)	$0.24
Reduction in operating cost under Group plan	.37
Total reduction	$0.61

Notwithstanding this substantial reduction, it will still cost $2.24 per ton to handle l.c.l. freight into and out of Chicago. No estimate has been made of the probable saving by consolidation of the city terminals, though a saving is no doubt possible.

Expansion of existing freight-house facilities with a continuation of methods now in use serves only to increase the unit terminal cost, which at present absorbs a large percentage of the revenue from line haul. For example, on l.c.l. shipments yielding an average revenue of two cents per ton-mile, these terminal costs are equivalent to a line haul of 112 miles on through business or a maximum of 224 miles on local business in and out of Chicago.

It is proposed to consolidate all city l.c.l. freight into cars carrying 11 tons each instead of seven as at present; to use cars of special design in which heavy loadings are practicable and possibly flats to carry containers. The latter should be loaded, insofar as possible, for firms and individuals, in order to avoid rehandling through downtown freight-houses. The question of containers for store door delivery is one that should have further study. If they are used from group yard to the city a greater saving may be effected.

Passenger Traffic

It is proposed to consolidate the traffic of the six existing passenger terminals into three, viz., the North Western station, the Union station and the Illinois Central station. In selecting the roads that are to use stations in common, consideration has been given to the tentative plan of the Interstate Commerce Commission for consolidating the railroads into 19 systems, and the roads using these passenger terminals have been grouped accordingly. (Under this arrangement, all roads now using the Grand Central, La Salle and Dearborn stations would use the Illinois Central station at Twelfth street with the exception of the Santa Fe and the Chicago Great Western, which are placed in the Union station.)

This plan has a distinct advantage in that the roads are

How Freight Traffic Could Be Routed—Plan for Proposed Rearrangement of Both Local and Through Operation—Showing Traffic Densities

grouped together at outlying points and consolidated still more as they come in, which helps to reduce the number of crossings to a minimum and will tend to develop good trunk lines for passenger business only. Another distinct advantage is the mileage saved by some of the roads which otherwise would reach their respective stations by very circuitous routes, in some cases from three to nine miles longer than the proposed routes.

Advantages Outweigh Disadvantages

The proposed plan can be made effective only through unified control and operation, but such control does not necessarily involve disturbance of existing ownership. Single administrative control is required and we believe may be secured by lease or operating agreement.

Consideration must be given to the business advantages accruing to certain roads by reason of superior location and industrial connections, but these are of relatively little moment in comparison with the operating advantages to be gained under the proposed plan and can no doubt be readily adjusted in the common interest. The improved operating methods indicated can be put into effect immediately upon the completion of the group yards, the proposed improvements along the Elgin, Joliet & Eastern and the addition of the required connections.

The Cost

The total cost of additional facilities necessary to accomplish the unified operation is estimated at $90,000,000 but as in the case of the other reports for joint terminal operation a large part of this cost is covered by estimated savings and the value of air rights which may be leased for commercial or industrial purposes. A summary of the cost is as follows:

Estimated cost of rearrangement of freight facilities between State street and proposed river channel, south of Polk street to Sixteenth, including change of Chicago river—as outlined and estimated in the Wallace plan		$43,000,000
Estimated cost of changing methods of operating freight terminals by elimination of interchange points, transfers and connecting railways as per group plan proposed by Board of Economics and Engineering—$46,550,000—or say		47,000,000
Total		$90,000,000
Less—Value of ground space released as estimated by John F. Wallace	$60,000,000	
Value of air rights on property retained under Wallace plan	25,000,000	
		$85,000,000
Estimated net cost of combined improvements		$5,000,000
Estimated net annual saving in operation cost and fixed charges under group plan alone ($16,155,259)		16,000,000

Pere Marquette's Surplus After Charges $3,765,880

Reorganization in 1917 and Increased Prosperity of Territory Put Road in Strong Position

THE PERE MARQUETTE in its recently issued annual report shows a surplus after fixed charges of $3,765,880 for the year ended December 31, 1921, as compared with $1,393,973 in 1920. The increase in net was due not to increased business, but to the result of improved conditions of railroading as evidenced in lower wage, fuel and material costs. There were also savings in the line of equipment. In ten months of 1920 the road had a debit balance in this item of $1,761,120. In 1921, all twelve months, the debit balance was only $690,654.

A comparison with 1920 must take into consideration that in that year the road was one of the few which did not accept the provisions of the guaranty covering the period from March 1 to August 30. Because of the peculiar conditions governing at that time, this proved to be unwise, because costs increased in greater proportion than could possibly have been foreseen. In other words, the road did not secure as great a net for the six months operating on its own account as it would have secured had it accepted the guaranty.

The Pere Marquette, as we know it today, is a very different property from what it was prior to the reorganization in 1917. There are two reasons for this. One is the drastic character of the reorganization; the other, the increased prosperity of the territory served due primarily to the development of the automobile industry.

The reorganization in 1917 brought to a close a very checkered career, because receiverships and reorganizations have been familiar episodes in the history of the Pere Marquette and its predecessors. The character of the reorganization is best shown by the fact that it reduced the company's funded debt from $78,000,000 to $36,000,000 and changed the proportion of funded debt from 73 per cent of the total capitalization to but 35 per cent. The company's funded debt at the end of 1917 was $36,325,000. At the end of 1921 this figure had been increased to $45,750,000, the reason being the inclusion, started in 1920, of the equipment trust notes covering the standard equipment allocated by the Railroad Administration. The amount of the notes on December 31, 1921, was $9,426,200. The equipment included 30 Mikado and 20 switching locomotives and 2,000 box and 1,000 hopper cars. With the inclusion of these notes the funded debt approximates 40 per cent of the total capitalization.

Dividends on Stock

The outstanding capital stock totaled on December 31, 1921, $68,675,000. It was increased to this figure from $28,500,000 in the reorganization. The stock includes $45,046,000 common; $11,200,000 cumulative 5 per cent prior preference stock and $12,429,000 5 per cent preferred, cumulative after January 1, 1919. Dividends on the prior preference stock have been paid regularly. The first dividends on the preferred were declared December 7, 1921, and totaled 10 per cent, covering the period to December 31, 1920. In April, 1922, the preferred dividend was put on a regular quarterly basis and at that time one per cent was declared on the cumulative dividends, leaving 4 per cent still in arrears.

With this more conservative financial structure the road is in a position to derive full advantage of the improved conditions in its territory. The nature of the expansion from which it will secure benefit is evidenced by the fact that the road earned for the government a slight margin in 1918 over its approximately $3,700,000 standard return and in 1919 nearly $3,000,000 more than its standard return. In 1920 it did not accept the guaranty and in that year it had a net after rentals of only $260,530. In 1921, however, it had changed this figure with considerably less traffic to a net after rentals of $5,106,442. Under the conditions it would appear that the Pere Marquette's traffic position is much improved over that of the period on which its standard return was based.

The Pere Marquette's corporate surplus after fixed charges in 1921 was $3,765,880. In 1920 it earned $1,393,973, as noted in the first paragraph. In 1918 and 1919 the net was $1,896,931 and $1,894,125, respectively. The prior preference dividends total $560,000 and the regular preferred dividends will be $621,450. This indicates that on the basis

of the earnings in 1921 there would be a considerable margin after payment of the prior preference and preferred dividends. The point, however, is that 1921 was not a good year, which further emphasizes that with normal business the road should be in an extremely favorable position—rather better than is readily realized by those not familiar with the new and improved financial and business conditions of the road.

Diversified Traffic

The Pere Marquette operates 2,223 miles of line. It has a line from Chicago to Buffalo and Suspension Bridge using trackage rights out of Chicago and over the Michigan Central east of St. Thomas, Ont. There is also another east and west line from Ludington to Port Huron and various north and south lines, such as the one from Grand Rapids north towards the tip of the Michigan peninsula and the line from Toledo to Saginaw. Two car ferries are operated across Lake Michigan from Ludington to Milwaukee and Manitowoc, respectively, and two across Lake Erie to Conneaut Harbor.

The road's traffic is diversified. Products of agriculture in 1921 made up 15.25 per cent; of animals, 1.56 per cent; of mines, 50.22 per cent; of forests, 6.76 per cent, and manufactures and miscellaneous, 20.46 per cent. Bituminous coal constituted 25.86 per cent of the total tonnage. In 1921 the total tonnage carried was 12,786,731. This compared with 14,855,393 tons in 1920, that year being the best in the company's history. The revenue ton-miles in 1921 were 2,172,802,065 as compared with 2,606,903,408 in 1920. In 1921 the average haul was 170 miles; in 1920 it was 175 miles.

The actual freight revenues in 1921 totaled $29,291,665 as compared with $29,754,566 in 1920, a decrease of $462,901. The average revenue per ton was 1.348 cents as against 1.141 cents in 1920. The passenger revenues were $5,940,618, or $997,887 less than in 1920. The total revenues were $38,161,241 as compared with $40,372,814 in 1920, or $2,211,574 less. The decrease in operating expenses as between the two years was $6,452,382. The operating expenses in 1921 totaled $30,279,574 as compared with $36,731,955 in 1920. The result of the greater proportionate decrease in expense was shown in a figure of net operating revenue of $7,881,667 in 1921 as compared with $3,640,859 in 1920 and in a 1921 operating ratio of 79.35 as against 90.98 in 1920.

Maintenance

The decrease in maintenance of way expenses was $730,449, or 13.76 per cent. The reduction was due partly to lower wage and material costs and partly to lesser work being done. The road put in track 621,748 crossties as against 862,343 in 1920. It laid 6,561 tons of rail as compared with 14,646 laid in 10 months of 1920. On the other hand, 115 miles were ballasted as compared with 84 in 10 months of 1920. The reduction in maintenance of equipment expenses was $1,614,230, or 16.51 per cent. The road's equipment condition at present, however, is about the same as the country's railroads as a whole.

The transportation expenses were reduced $4,073,679, or 20.71 per cent. The expenses per revenue train mile decreased from $2.53 in 1920 to $2.12 in 1921, or 16.21 per cent. "The chief factors contributing to the decreased cost," says the report, "were the reduction in forces, the decrease in rates of pay and decrease in price and consumption of fuel. There was a further decrease because of the increased cost of operation in the year 1920 due to the railway switchmen's strike." Referring to fuel, the report continues: "The competitive condition of the fuel market allowed a wider purchase range and, for the first time in several years, a choice of fuel, resulting in a lower purchase price and a marked improvement in quality. A large portion of coal used in 1921 came from the West Virginia coal fields. The decrease in price resulted in a decrease of $143,501 in the cost of fuel for locomotive use; and as a result of the improvement in the quality of coal, increased efficiency and a decrease in the number of locomotive miles run, the number of tons of fuel consumed by locomotives in this service decreased 234,786, which, at the average rate of $4.85 per ton, resulted in a decreased cost of $1,138,712."

Because of the decreased traffic it is to be expected that the operating statistics would not be as favorable as in 1920. The average train load in 1921 was 539; in 1920, 588. The revenue car load was 22.79 tons; in 1920, 24.22 tons.

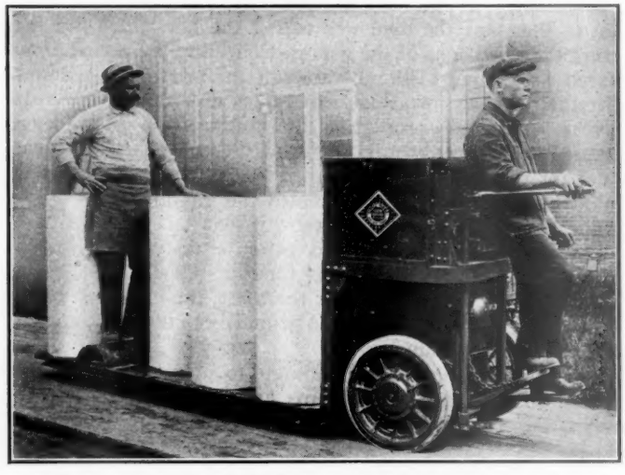
New Engine Terminals

The Pere Marquette in 1921 purchased 12 passenger and baggage cars. It completed new engine terminals and accompanying facilities at New Buffalo, Mich., including a 16-stall brick engine house, a 250-ton coaling station, a 100,000-gal. water tank, etc., costing $718,000; at Saginaw, a 30-stall house, a 100-ft. turntable, etc., costing $1,000,000; at Plymouth, Mich., a 15-stall house, 100-ft. turntable, 100,000-gal. tank, etc., costing $400,000. A three-story warehouse costing $125,000 was completed at Wyoming, Mich., and a new station at Belding, Mich. Another important project is that embodied in the Flint Belt Railroad giving the Pere Marquette a new freight line around Flint, Mich. About $70,000 was spent on this line in 1921, this being about 10 per cent of the total estimated cost of the project.

Low Platform Electric Truck

An electric truck with an especially low loading platform has been designed by the Elwell-Parker Electric Company for handling barrels, bales, bags or heavy rolls. The truck is made up of about 95 per cent of standard parts on a special frame, and is designed for use where hauls are so long that a man with a hand chisel truck is too slow and expensive a means for the movement of material.

There is a storage battery over the driving wheels on the upper deck. The motor and worm drive axle are located under the upper deck. All four wheels steer and the raised portion near the end of the platform, known as the "kick-up," houses the rear wheels. The driving wheels are fitted with 21½ in. by 3½ in. rubber tires, and in the trailing wheels with 10½ in. by 5 in. tires. The truck will run from 15 to 20 miles on a single battery charge.



The Truck Is a Drop-Frame Truck of Special Design

Swedish Diesel-Electric Motor Car of 250 Horsepower

Diesel-Electric Motor Cars for Railway Service

Successful Operation in Sweden Has Led to the Introduction of 250-Horsepower Cars

SWEDEN is one of the countries which is obliged to import its supply of locomotive fuel and consequently the greatly increasing cost of coal is a serious factor in operating expenses. An abundance of water power has made electrification practical on a number of lines where the traffic is heavy but this change is not feasible on a large amount of mileage where the traffic is relatively light. Both improvements in steam locomotives and the substitution of other sources of power are receiving thoughtful attention. Considerable pioneer work in the application of Diesel engines for railroad motive power has already been carried on in Sweden. The system favored uses a Diesel engine to drive an electric generator which furnishes power to motors mounted on the trucks. The first car, built in 1913, had a 75-hp. engine. This was followed by several other cars with the same sized engine and later by others of 120 hp. These cars were built and equipped by the Swedish General Electric Company and the Atlas Diesel Company working in conjunction.

These early motor cars proved to be so satisfactory in operation that a separate company, the Diesel-Electric Car Company, Vasteras, Sweden, was organized to carry on further development work. The new company has turned out several cars of the smaller sizes and in addition built cars of 160 hp. and 250 hp. which are now in regular service. At the present time 12 Diesel-electric motor cars are in service on seven Swedish railroads. That none of the cars delivered has been taken out of service, except when impossible to obtain oil during the war, and that all orders recently received have been from roads that already had at least one car in operation is indicative of the success of the general design.

The cars with 75-hp. or 120-hp. engines were provided with compartments having seating capacity for a number of passengers or with space for baggage and mail. One or more small trailers were commonly hauled. The larger capacity cars lately built are not provided with accommodations for passengers but compartments for baggage and mail have been retained, passengers being accommodated in regular coaches hauled by the motor car.

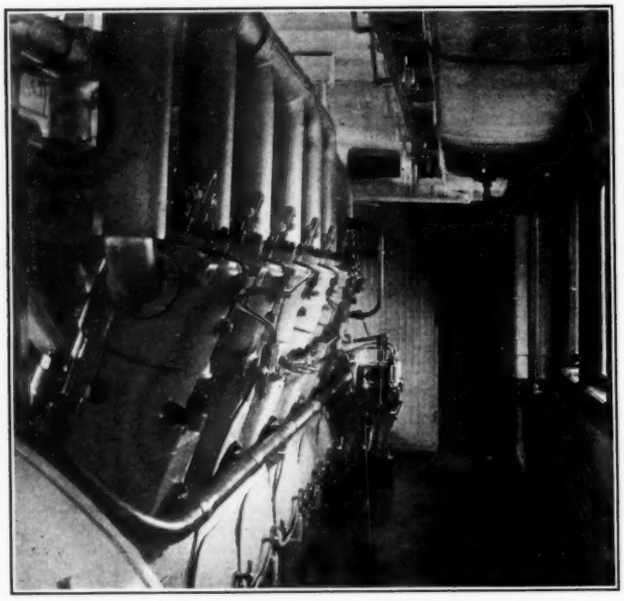
Cars of 160 hp. weigh 37,500 kg. (82,500 lb.) and, when grades do not exceed one per cent, are capable of hauling a trailing load of 67½ metric tons (74¼ short tons) at ordinary speeds. This is a total train weight of 105 metric tons (115½ short tons). Cars of 250 hp. weigh 50,000 kg. (110,000 lb.) and under the same conditions can haul a trailing load of 115 metric tons (126½ short tons) which corresponds to a train of 165 metric tons (181½ short tons) including the motor car. Plain trucks are used on the engine compartment end of these cars and motor trucks, one motor for each axle, under the other end. The cars can be operated equally well from either end. With the passenger cars used in Sweden, which are much lighter than are customary on American roads, the 160-hp. car can haul a train with about 225 passengers while the 250-hp. car can haul a train holding 375 passengers.

When hauling full trains the fuel oil consumption for the 160-hp. engine should average about 0.7 kg. per train kilometer or 2.5 lb. per train mile, while the consumption for the 250-hp. engine should average about 1.0 kg. per train kilometer or 3.5 lb. per train mile. Oil records of a 160-hp. motor car for an extended period in regular service handling a train of 90 metric tons (99 short tons) showed a fuel oil consumption of about 0.5 kg. per kilometer or 1.8 lb. per train mile. By weight, the fuel oil consumption of the Diesel engines averages about six per cent of that of the coal used by steam locomotives of the same power.

The 160-hp. engine has eight cylinders and the 250-hp. twelve cylinders but otherwise they are similar in general design to the smaller engines. A number of improvements

have, however, been introduced in the later designs of motor cars. The cooling water for the Diesel engines is now recooled in a number of radiators similar to those used for gasoline motor trucks, mounted on the roof of the car as shown in one of the illustrations. Cooling is effected by means of a fan-blower driven directly from the main engine and is thus independent of speed. The motors are now arranged to be connected either in series or in parallel.

In addition to low fuel costs, one man operation and little time or attention required at terminals, experience has shown that Diesel-electric motor cars can make a greater mileage



Engine Room of 250 Horsepower Diesel-Electric Motor Car

per day, spend less time in the shop and run for much longer periods without a general overhauling than steam locomotives. They are capable of making 50,000 to 60,000 miles per annum. Even after being taken in for overhauling after some 60,000 miles it has been found that the largest item of expense is for dismantling and reassembling.

While the Diesel motor car or locomotive will undoubtedly be still farther perfected and adapted to a wider railroad field of usefulness, indications point to a much more general employment of this general type of motor in the near future.

The Co-Operative Switching of Joint Tracks Succeeds at Seattle

EARLY IN 1918 PLANS were formulated by the operating officers of the United States Railroad Administration on the Pacific Coast for the unification of the terminals of the railways entering Seattle, Tacoma and Everett, Wash. These plans were put into effect about September 1, 1918, and remained in operation until the termination of federal control. (See *Railway Age*, September 1, 1918, page 203.)

On March 1, 1920, the various facilities were returned to their respective owners and independent operation of both freight and passenger terminals was resumed, with the exception that a so-called zone plan of switching was developed by the Northern Pacific, the Chicago, Milwaukee & St. Paul, the Oregon-Washington Railroad & Navigation Company, and the Great Northern, to apply to certain districts where these roads were jointly interested or where two or more of them had private tracks serving the same industry. The thought underlying this zone plan was that one locomotive could perform the switching service for all of the interested roads at such points. Seven such zones were created, two of which were assigned to each road with the exception of the St. Paul, which assumed charge of one.

The arrangement which has been perfected provides that the line handling the switching within this zone shall furnish the locomotives and crews and assume all of the expense incident to the joint operation, the cost being divided on the basis of the number of cars handled. A daily report is made to the officer in charge of the zone, showing the time that each locomotive enters and leaves the zone, the time spent in it and the number of cars moved into and out of the zone for each of the participating companies. The intra-zone switching revenue collected is credited to each zone separately, while locomotive expense is charged at a flat rate varying from $9 to $10.50 per engine hour according to the class of locomotives used.

Joint interchange tracks have been established convenient to most of the lines entering the city. Certain tracks have been set aside for receipt and delivery of cars to each line. The arrangement requires that direct interchange be made with the railroads operating each zone. The usual interchange reports are submitted to cover the movement of all cars. Joint car inspectors have supervision over the equipment moving in interchange and when necessary make light repairs for all lines, this expense being divided on a car basis as is the cost of joint yard checkers working on the interchange tracks. The maintenance of the interchange tracks is distributed on the basis of ownership.

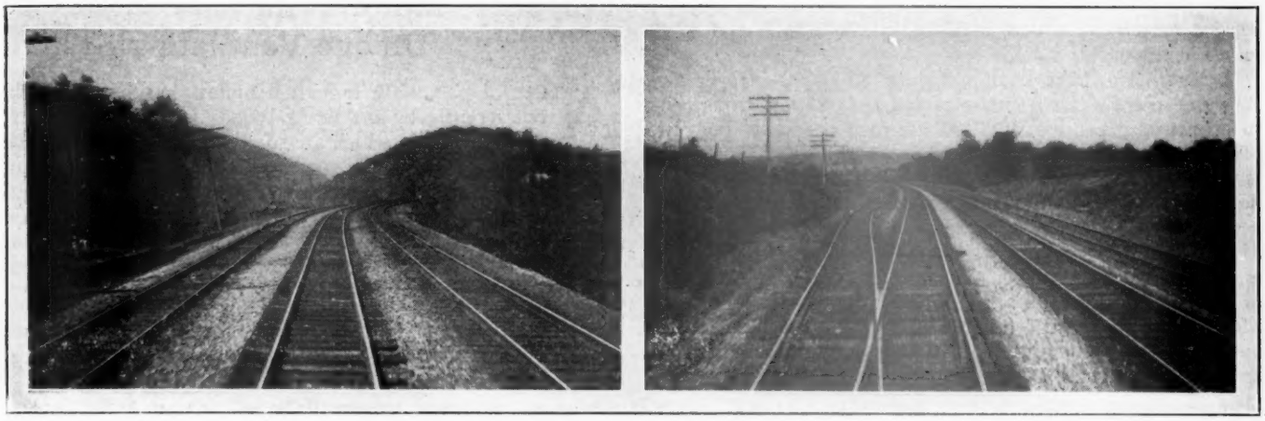
Enginemen and switchmen engaged in zone switching are considered joint employees, when within the limits of the zone, for the purpose of determining liability. All expense incurred on account of loss or damage to engines or tracks, or because of the injury or death of a joint employee or third person is considered part of the zone switching expense, while the loss or damage to cars or contents is assumed by the road for whom the car is being handled.

The carding system for cars is in force throughout the terminals and all cars are returned to the delivering line, loaded or empty. When cars are switched to or from a track belonging exclusively to one road within the zone the tariff rate is charged and such cars are not counted as zone expense, nor is the time of the locomotive or crew engaged in switching upon such a track charged to the zone. Reclaim is allowed on cars switched to tracks jointly owned or used.

It has been found desirable to make interchange reports of all cars moving to or from zones in order to maintain proper car records. A copy of the daily yard check is furnished by each zone to all of the lines interested. The agents and general yardmasters of the lines operating the various zones are held jointly responsible for these records and for the proper performance of the switching service. The maintenance of tracks within a zone which belong exclusively to one road is handled by the owner, while the maintenance of tracks owned or used jointly is divided on a car basis. Each road looks after its own demurrage.

Under the unified plan of terminal operation put in effect during federal control, the switching cost of handling cars in the Seattle terminal varied from a minimum of $2.09 in June, 1919, to a maximum of $3.56 in January, 1919, whereas the zone cost per car to all lines during 1921 was approximately $1.61. While the figures covering the cost of switching all cars, including those handled by non-zone engines for all lines are not available, the average cost per car for two of these lines was approximately $1.68. In comparing these figures due allowance should be made for the fact that the yards were not as congested in 1921 as they were during the war. However, the cost of switching has been greatly reduced and the service improved by the plan.

We are indebted for this information to J. H. O'Neill, general manager of the Western lines of the Great Northern.



Lehigh Valley Car Repairs Big Factor in 1921

Corporate Income Account Shows Balance After Charges of $10,050,798—Surplus Now $43,531,330

THE LEHIGH VALLEY'S corporate income account for the year ended December 31, 1921, shows a net after fixed charges of $10,050,798. The property pays dividends of seven per cent on its $50 par value stock. These dividends in 1921 amounted to $4,245,749; in other words, they were earned considerably more than twice over. Although the 1921 net after charges compared with $13,511,917 in 1920, it was much in excess of the figure of $4,977,213 in 1919 and of $6,592,834 in 1918. The principal reason for the decrease from 1920 and the expansion over 1919 and 1918 was due to the item of other income, or, to be more explicit, to dividends and interest receipts on securities of affiliated companies, notably the coal properties. In 1918 the Lehigh Valley received such dividends and interest amounting to $2,601,543; in 1919 to $1,302,834. In 1920, however, these dividends totaled $15,661,525 and in 1921 $10,616,311.

The company's profit and loss account showed on December 31, 1921, a surplus of $43,531,330. This indicates the strong financial position of the company. It is further of interest to point out that in 1921 the company retired $1,300,000 unmatured equipment trust certificates. At the end of 1920 the road reported that it had no such trusts in the hands of the public. In the present case it reports that it now has no equipment trust certificates at all.

Equipment Maintenance

The distinguishing feature of the Lehigh Valley's operations in 1921 was the attention given to the matter of equipment maintenance. The maintenance of equipment account for the year totaled $25,138,717, or 34 per cent of the total operating revenues. This amount compared with $23,641,002 in 1920; in other words, it was $1,497,715 in excess of the record figures for that year. The road's standards of both way and equipment maintenance are high. The increased expenditure for equipment maintenance in 1921 was the result of its effort to maintain these standards and to overcome the harmful results of the manner in which cars failed to be repaired during the period of federal control when the larger portion of the equipment was off-line and failed to receive proper attention. Since April, 1920, the road has rebuilt or rehabilitated 16,575 cars, inclusive of 2,000 recently scheduled for that treatment. The road's total ownership of freight cars is about 40,000, so the measure of what has been done is evident.

"Approximately $8,037,400 More"

President E. E. Loomis, in the annual report, speaks of the situation in part as follows: "Because of the high rates of pay and expensive restrictions governing working conditions for railroad employees, prescribed by the United States Railroad Labor Board, but which do not apply in other industries, favorable contracts were made with several outside concerns for part of the work. A total of 9,975 cars were delivered to various car builders for general repairs during the year, on which your company saved $690,275 as compared with the cost of making these repairs at its own shops which, in the past, under normal conditions, have been able to take care of this work. As an illustration of the deplorable condition of equipment at the termination of federal control, your company expended . . . . for the maintenance of engines, cars and floating equipment during 1921 . . . . approximately $8,037,400 more than would have been disbursed had expenditures been limited for this purpose to the same ratio as applied on other railroads during the year, according to Interstate Commerce Commission records."

Anthracite Coal Supplied 37 Per Cent of Operating Revenues

The Lehigh Valley's operating revenues in 1921 totaled $74,929,913 as compared with $75,223,862 in 1920. There was a decrease of but $293,948. The company shows its coal revenues separately. Anthracite coal revenue in 1921 totaled $27,951,609, or $4,174,126 more than in 1920. Reductions in revenues on other traffic, however, over-balanced this increase. The revenue tonnage carried in 1921 totaled 26,377,743, as compared with 32,103,897 in 1920. The reductions in the various classifications of commodities were fairly general. Anthracite coal tonnage, however, held up rather well. It totaled in 1921 13,028,065 tons, constituting 49.39 per cent of the total tonnage and supplying 37 per cent of the total revenues. In 1920 it totaled 13,485,191 tons, 42 per cent of the total tonnage and supplying 32 per cent of the total revenues. There were increases in wheat, in flour and, in fact, in products of agriculture and of animals generally, which would apparently emphasize the grow-

ing importance and success of the Lehigh Valley's fast freight service concerning which, incidentally, favorable reports are being heard on all sides.

As against a decrease of not quite $300,000 in operating revenues, there was a decrease of $12,785,083, or 16 per cent, in operating expenses. In 1920 the road operated at a ratio of 107, which figure was reduced in 1921 to 90. This figure is high but is apparently explained by what has already been said about maintenance expenses. The operating expenses in 1921 were $67,530,014, as compared with $80,315,096 in 1920. There was a reduction of $4,010,423 in maintenance of way expenses, an increase as already noted of $1,497,715 in equipment expenses and a reduction of $10,090,279 in transportation. In 1921 the Lehigh Valley had a transportation ratio of 42, which compared with 55 in 1920. In August, 1921, the road showed a transportation ratio of but 37.

Preparation for the Future

The Lehigh Valley's net operating revenue—revenues less expenses—in 1921 was $7,399,899, which compared with a deficit in 1920 of $5,091,235. In other words, there was an increase in this item of $12,785,083. The net after rentals gave a figure for 1921 of $5,582,216, as compared with a deficit after rentals in 1920 of $6,779,615. For purposes of comparison, it may be noted that the company's standard return based on its average of net railway operating income or net after rentals for the three years ended June 30, 1917, was $11,318,714. The year 1921 did, therefore, not bring the road back to this average. The reason apparently was the decreased traffic, but more particularly the high expenses for equipment maintenance.

In view of what has been said concerning the latter factor, the general conclusion would be that the Lehigh Valley devoted 1921 to putting its house in order for the future, or in making up, in other words, for the difficulties occasioned by federal control and the peculiar railway conditions since. The road has, therefore, strengthened its position generally in the competitive territory between New York and the Niagara frontier. The company's large surplus and its strong financial position generally, relieved it, insofar as concerned 1921, of the necessity of making as favorable a paper showing as it might under more difficult conditions have found it necessary or advisable to make. The road, when all is said and done, should be able to show excellent results in 1922 although, of course, the fact that 37 per cent of its earnings come from the carriage of anthracite coal, will have to be borne in mind because of the present cessation of anthracite coal mining.

Progress on New Terminals

The Lehigh Valley has made much progress in recent years in the matter of terminals. This included in 1921 the work on the Claremont Terminal in New York harbor. President Loomis gives these details: "The first unit of this development, which will be ready for service during the year 1922, is a pier more than two-thirds of a mile long, with 35 ft. of water alongside, at which the largest ship afloat can be berthed. Its facilities include a two-story warehouse with a capacity of 500 cars of freight, an open dock served by a 30-ton traveling gantry crane capable of handling 100 cars of freight a day, and two electrically operated unloaders to handle ore and coal from vessels to cars, with a capacity of 20,000 tons per 24 hours. As increased traffic warrants, two additional piers will be built. When completed in its entirety, the terminal will afford docking facilities of approximately 5½ miles, capable of berthing the largest ocean-going craft."

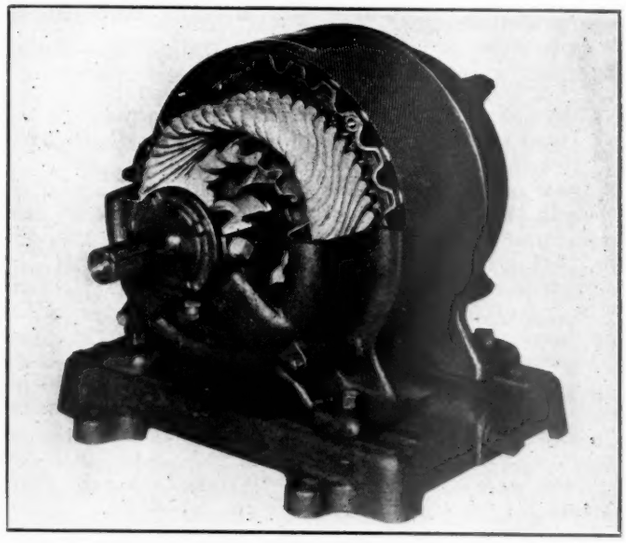
THE NEW YORK CENTRAL'S MOTION PICTURE, designed for the education of shippers in the proper methods of packing merchandise, is being shown along the line of the Boston & Albany.

Polyphase Motor With Unique Ventilating System

A LINE of polyphase induction motors has been brought out recently by the S. A. Woods Machine Company, Boston, Mass., which are so designed as to prevent the accumulation of oil on the motor winding and the resulting collection of dirt. The new Woods semi-enclosed 40-deg. induction motor, as it is known, is so built as to screen the ventilating air before it enters the windings and to direct this air so that it opposes the entrance of oil into the windings from the waste-packed bearings.

While the motors are ventilated or air-cooled, they are virtually enclosed from a mechanical standpoint. Air enters at the perpiphery of the machine and is discharged at both ends, the direction of the air flow being opposite to that found in most motors. It is claimed that oil leakage caused by careless filling of bearings cannot occasion bad results, because such oil is expelled from the ends of the motor instead of being driven into it.

The motor frame or casing is made from a single piece of currugated sheet steel. The corrugations are equally spaced and in mechanical contact with the stator core, so that much



Ventilating Air Is Reversed to Keep Oil Out of Windings

of the heat generated in the core and its windings is conducted to the casing, which therefore forms a large surface for the radiation of heat to the ventilating air.

Air entering at any point along the surface of the screen travels over the outside of the corrugations through holes provided at the center of these corrugations, then through the lateral ducts between the casing and core, then over the windings at the end, and finally is discharged at each end of the motor.

Fans are provided at the ends of the rotor for the purpose of drawing the cooling air through the machine. They are of unique design and it is claimed that a stream of air is drawn directly over the bearing housing and immediately expelled without entering the motor, while another stream is drawn through the machine and expelled at the same points. These fans are made of a single piece of sheet steel welded to the thrust collars. Rotor windings are used which have bars and end rings made of one piece of metal, entirely eliminating mechanical or electrical joints, the windings being molded or cast on the magnetic core. The motors are built in sizes up to 30 h.p. at 1,800 r.m.p. for 60-cycle polyphase circuits with corresponding capacities at other standard speeds and frequencies.

Operating and Maintaining Oil Burning Locomotives*

Oil Tanks; Piping; Location of Burners; Drafting; Preventing Air Leaks; Cleaning Soot from Flues; Maintaining Oil Temperatures

THE FIRST ATTEMPT in the United States to burn crude oil in the firebox of a locomotive was made at Santa Paula, California, in October, 1894. The subsequent study of combustion soon led to a better understanding of the firebox and boiler design and realizing the many advantages to be gained by the use of oil as fuel, every effort was made to develop the most efficient burner and drafting arrangement. Most obstacles were overcome and in a comparatively short time a high degree of efficiency was attained.

Crude oil possesses many advantages over other fuels and in the west its use soon became widespread. At no time during the past few years has the production of crude oil in the United States been sufficient to meet requirements, and records for June, 1921, show the consumption of 81,000 barrels per day in excess of production, which deficit was and is being supplied from the Mexican fields.

Daily production, United States, June, 1921	1,346,833 bbls.
Imports from Mexico	340,175 bbls.
Total	1,687,008 bbls.
Daily consumption	1,427,367 bbls.
Amount placed in storage daily	259,641 bbls.

At the present rate of consumption we are told by geologists that the crude oil supply in the United States will be exhausted within a few years as there now remains but about 60 per cent of the original supply underground. With this prospect in sight it is small wonder that strenuous efforts are being exerted to conserve the remaining supply by maintaining and operating oil burning locomotives as economically as possible. At the present time there are about 41 railroads operating in 21 states which burn oil for fuel, some, however, on a very small part of their power.

The maintenance of the locomotive rests largely with the enginemen. The medium through which the maintenance is accomplished is the work report and its correct rendition. This means that if the locomotive is to perform economically at its maximum capacity specific information must be given to the roundhouse force as to just what defects were noted under actual operation. Maintaining an oil burning locomotive would be a very simple task if a thorough and accurate report of defects noted by engine crews were reported at the end of each trip. "Don't Steam" covers a multitude of sins but the worst sinner of all is the man who writes it on his work report, with no further detail, and then has writer's paralysis.

Generally speaking there are but few points of difference in maintaining an oil burning locomotive as compared with a coal burner and these points of difference affect the design of tender, oil piping and firebox arrangement. The fuel oil tank is constructed of ⅜-in. material and the capacity is approximately 3,000 gallons—a coal equivalent of about 17 tons on the basis of 42 gallons per barrel and 4 barrels of oil equal to a ton of coal. On filling the square tank a 2-in. space is left in the top and on semi-cylindrical 6 in., to allow for expansion when the oil is heated. The ratio of expansion is one per cent for each 25 deg. F. increase in temperature. Fuel tanks are provided with a measuring rod designed to show inches on one side and gallons on the other so that accurate measurements may be obtained at all times.

Oil flows to the burner by gravity on all types of locomotives except the Mallet, in the tender of which is used six pounds air pressure. The oil piping arrangement conveys the oil from the tank to the burner, from which it is sprayed into firebox by steam. This conduit is two inches in diameter and passes through a superheater four inches in diameter which is used, in addition to the tank heater, to heat the oil before it reaches the firebox. The tank heater should be so constructed and maintained as to keep the oil at the proper temperature, the oil feed line should be free from leaks, with as few elbow joints as possible; metal with flexible joints is preferable to rubber. The cut-out or safety valve on the tender, the blow-back valve, superheater and firing valve should all be in perfect working condition. Burner should be of suitable size, varying from one inch to three inches according to size of firebox, clean and lined up about 60 in. from the flash wall to insure perfect combustion. The correct distance from burner to fire pan floor is 6 in. to 9½ in., depending on the draft arrangement, and particular attention should be given to see that the burner is so placed that the oil strikes the flash wall in the center. Care must also be exercised to see that fire pan is free from air leaks with no obstruction on the floor and that all damper controls are in perfect working order.

There are two ways of drafting an oil burning engine; one, the horizontal draft and the other the vertical. Both are in general use on oil burning roads. The arrangement of the brick work on both drafts is practically the same. The horizontal draft, by which air is admitted through the fire door, is the most economical, but in poor water districts, from the standpoint of boiler maintenance, the vertical draft arrangement with the flat door, by which air passes to the rear of the firebox, prevents cold air from reaching the stay-bolts and thus reduces boiler maintenance. The horizontal draft in good water districts has proved very successful both from the standpoint of maintenance and fuel.

Air openings through the fire pan should vary, depending on the size of the firebox—from 16 sq. in. air admission around the burner and 85 sq. in. at the rear of the firebox, to 225 sq. in. around the burner and 224 sq. in. at the rear. It has been found that the best results are obtained on an oil burning engine with the use of an extension stack extending down to the center line of the boiler, 12 to 16 in. in diameter.

To secure the best results the fire pan should be welded to the mud ring and rigidly secured so as to obviate all possibility of air leaks at sides and front or behind the brick work. Too much attention cannot be given to the maintenance of fire pans on oil burning locomotives.

Front end air leaks and outside steam leaks should not be tolerated. In the roundhouse one man should be assigned to make torch tests and repair all air leaks into the front end and around outside steam pipes. There are many recommended practices for the elimination of air leaks around outside steam pipes. The best one in use is the application of a casing of ¼-in. steel plate with a welded seam. This casing is riveted permanently to the smoke box and then caulked or welded around the edge to make it airtight. It is large enough in diameter to allow removal of the steam pipes without disturbing it. The lower end of the casing is flanged outward and to it is riveted a wrought iron ring. A cast iron flange made in halves is fitted together and bolted snugly around the steam pipe, which is machined true at this point. This flange is secured to the wrought iron ring with eight studs and a copper wire gasket is used between them to

*Abstract of a report presented at the meeting of the Traveling Engineers' Association, at Chicago, September 8, 1921.

obtain an airtight joint. A copper gasket is then caulked into a dovetail groove in the cast iron flange around the steam pipe.

Operation of oil burning locomotives call for the same attention from the engineer as on a coal burner but the fireman has no manual labor to perform in delivering fuel to firebox. But he has to be alert at all times for there is no bank of burning coal to aid him in keeping an even firebox temperature when the engineman is working a light throttle or drifting after having forced the locomotive to its capacity. A supply of clean, gritty sand should be used in the sand box of the locomotive with a sand scoop so the fireman can clean the soot from the flues. Flues should be sanded while running by placing a small quantity of sand in the scoop and by inserting through an opening in the fire door while the engine is working hard, allowing the exhaust to draw the sand through the flues. It is good practice to sand frequently in order to keep the soot removed. It is a nonconductor of heat and causes the steam pressure to drop rapidly. Enginemen should take care to give the valve sufficient travel and open the throttle far enough so that the exhaust will carry sand through the flues and do the work for which it is intended. The sand scoop should be held as far in the fire door as possible in order to prevent sand from falling on brickwork or flash wall.

Firemen should watch the temperature of oil and endeavor to keep it just warm enough to insure an even flow to the burner. This temperature will vary from 100 deg. F. for light California or Texas oil to 180 deg. for heavy Mexican oil. The fireman has direct control of the amount of steam used to heat the oil in the tender and unless he is careful he may not only damage the oil by overheating it so that it loses its lighter gases, but also increase the danger of explosions from the escaping gas. Where excessive steam is turned into the tender there is excessive condensation and unless this water is drained off it will go to the burner and often puts the fire out. Heating the oil in the tender is not for the purpose of aiding in burning it but to cause it to flow in a steady, even stream from the tender to the oil feed line, where it passes through a superheater box before it reaches the burner. The purpose of the superheater is to raise the oil to a temperature at which it will be easily broken up by the atomizer as it goes from the burner tip into the firebox. Since it takes less than one-fifth of a second for a particle of burning oil to travel from the burner tip to the flue sheet, it is of the utmost importance to have oil so atomized that no time is lost in burning it. The use of the blower is to create sufficient draft to keep the firebox clear of smoke and gases and to produce artificial draft. The misuse of the blower causes waste of fuel and damage to the boiler. Very light applications should be indulged in under all conditions. The strong use of blower draws cold air into the firebox, damaging the flues and flue sheets, and causing them to leak.

A slight color of smoke at the stack is better than no smoke at all, for a clear stack indicates too great an amount of air. Losses from too much air are frequently three times as great as from insufficient supply. Firemen should avoid black smoke at all times if possible; it indicates a loss of fuel and should not be tolerated. Black smoke is either the result of faulty firing or the condition of the engine. The firing valve by which the flow of oil to the burner is regulated requires constant attention. Lost motion frequently occurs in this apparatus. Much fuel is wasted when the fireman loses the correct adjustment of this valve because of too much play either in the rods or in the valve itself.

When an engine is worked to full capacity on long grades and has been fired heavily it requires very careful attention to prevent flues fro... leaking as the small tongue of flame does not fill firebox sufficiently to keep out the cold air. Enginemen cannot be too careful at such times; they should start gradually to ease off on the throttle, allowing the fireman plenty of time to adjust his firing valve. Injectors should be shut off at once, if only for a short time, and then worked at short intervals. In most cases engines start leaking while descending grades after having been worked hard. Careful team-work between engineer and fireman will prevent black smoke when shutting off or pulling out of stations.

The report was signed by J. N. Clark (Chairman), Sou. Pac. Co.; J. C. Harris, G. H. & S. A.; H. H. Kane, Gulf Coast Lines; E. F. Boyle; E. E. Cornish, M. K. & T., and W. G. Tawse, Locomotive Superheater Company.

Discussion

In answer to a number of questions relative to the terminal handling of oil burning locomotives, J. N. Clark (Southern Pacific) stated in closing that from 50 gallons to 175 gallons of oil are required to fire up engines at terminals, requiring from 30 min. to 1 hr. 50 min. before leaving time. A test made with a 2-8-2 type locomotive weighing 207,000 lb. on drivers, was fired up with ⅓ glass of water at 120 deg. in a total time of 108 min. to 200 lb. gage pressure, with a consumption of 119 gallons of oil. In comparison with 15 per cent to 25 per cent of the fuel consumed at terminals on an eastern coal burning road, the terminal oil consumption was estimated at about 8 per cent of the total fuel.

Mr. Clark referred to a test made under the supervision of the fuel conservation committee of the Southern Pacific in which the fuel consumption per 1,000 ton-miles was measured for a 1,000-ton train hauled by a 2-10-2 type superheated locomotive. At 5 miles an hour the oil consumption was .3 gal.; at 10 miles an hour, 1.1 gal.; at 15 miles an hour, 2.5 gal.; at 20 miles an hour, 4.5 gal.; at 25 miles an hour, 7 gal.; at 30 miles an hour, 10 gal.; at 35 miles an hour, 13.7 gal.; at 40 miles an hour, 18 gal.; at 45 miles an hour, 22.7 gal., and at 50 miles an hour, 28 gal. A test to show stand-by fuel consumption showed that 45 gal. of oil per hour was refined to hold train and run the air pump, while 37 gal. an hour was burned by a light engine standing.

Missouri Pacific Continues to Show Large Savings from Water Treatment

THE CARE with which the Missouri Pacific has compiled records of the economies in operation resulting from water treatment has caused the reports of this road to be watched with interest from year to year. In the report for 1921, which has recently been compiled, it is shown that the 77 treating plants on the system, including ten placed in service last year, treated 1,781,560,000 gal. of water from which 4,916,247 lb. of scaling solids were removed. Using 13 cents as the conservative estimate of the savings per pound of scaling solids removed, there was a total saving of $613,964, from which should be deducted $170,575 for the cost of treatment, supervision and depreciation of plants, leaving a net saving of $443,369, or a return of 143 per cent on the $309,611 invested in treating facilities.

The total consumption of water on the system during 1921 was 5,948,117,000 gal., of which 5,153,024,000 gal. was used for making steam. Of this latter amount 34.6 per cent was treated. The average cost of treatment in 1921, including operation, supervision and ten per cent depreciation, was 9.8 cents per 1,000 gal. It is estimated that the removal of these solids from the water resulted in a saving of approximately five per cent or 62,000 tons in coal consumption, while the records show that the life of flues and fireboxes has been more than doubled in many districts since treating plants were installed and that delays to traffic from engine failures due to boiler troubles have been reduced from 30 to 60 per cent.

General News Department

Oral Argument on A. B. & A. Valuation

Oral arguments were presented before the Interstate Commerce Commission on May 13 on the motion of the Atlanta, Birmingham & Atlantic to correct and amend the supplemental tentative valuation of its property issued by the commission. W. G. Brantley argued on behalf of the road and C. W. Needham for the commission. Whereas the tentative report assigned as the final value of the used property $25,630,000, the carrier claimed that it should be not less than $36,000,000. Hearings were also held before Examiner Marchand on May 15 in the cases of the Norfolk Southern and the Mobile & Ohio.

Government Attempts to Prevent Increased Coal Prices

While the administration has no plan for settling the coal strike, it was announced at the White House on Tuesday that it was interested in preventing undue increases in the price of coal, such as have appeared in some districts. Later Secretary Hoover announced that he would call a conference of coal operators for this purpose in the near future. He has also requested the American Railway Association and the public utilities associations to create buying committees to handle their coal purchases and will also ask other large consuming industries to take similar measures to avoid the danger of buyers bidding against each other.

American Express to Operate on Alaska Railroad

The American Railway Express Company has contracted with the Alaskan Engineering Commission to do express business on the United States Government Railroad in Alaska, beginning on May 15. The length of road operated is 537 miles. Express service has been carried on in Alaska and in the Yukon territory for more than 25 years, the American Railway Express having succeeded to the business of the Wells-Fargo Company in that region. According to the Official Guide the Alaska Railroad operates passenger train twice a week each way, except for one section, of 64 miles, where there are three trains a week. Trains are run only in the day-time, and a passenger traveling by railroad from Seward to Fairbanks must stop over night at Anchorage, at Curry and at McKinley Park.

Messenger Foils Daring Hold-Up

An attempt was made early in the morning of May 15 by eight masked men to rob the westbound Golden State Limited (a C. R. I. & P., E. P. & S. W. and S. P. train) at a lonely spot between Jaynes, Ariz., and Cortaro, on the line of the Southern Pacific about 10 miles west of Tucson. Forcing a tramp who had been riding blind baggage to uncouple the mail and express cars, they forced the engineman to pull the cars about 300 yards ahead and then opened up with their guns.

But Express Messenger Harry Stewart opened the door of his car and shot and killed one of the bandits; and soon after wounded another. The robbers then became scared and took to their waiting automobile and fled. The dead bandit was identified as a rancher resident in the vicinity.

The Pullman Hotels at New Orleans

During the triennial conclave of the Knights Templar in New Orleans, La., on April 24-27, the three principal railroads provided sleeping and eating accommodations for visitors by parking Pullman cars in their yards. The Pullman Company reports that 175 cars were run on a per diem basis, and 109 according to berth rate; a total of 284 cars. In the Poydras yard of the Illinois Central, 124 cars were parked and 2,500 guests taken care of. A total of 3,211 meals were served by this road in its dining cars in this yard. A laundry company with headquarters in warehouse No. 3 (converted into a clubhouse), handled more than 500 bundles of laundry. The road also installed 24 shower baths in this clubhouse.

The Southern Railway, which also parked a number of cars in its yards, lighted its thoroughfare with electric lights of 1,000 watts and erected signs indicating the exact location of all commanderies. Two freight cars were converted into shower bath compartments, one car for men and one for women. The Louisville & Nashville parked 72 cars adjacent to Elysian Fields avenue, between Tonti and Decatur streets, and likewise provided the necessary features for the comfort of its patrons.

Federal Trade Commission Investigates Proposed Steel Merger

Upon receipt of the resolution adopted by the Senate on May 12, introduced by Senator La Follette, directing the Federal Trade Commission and the attorney general to inform the Senate as soon as possible what steps have been taken or what steps will be taken to ascertain the purposes and probable effects of the proposed merger of seven of the largest iron and steel corporations, the Federal Trade Commission, on May 13, sent a demand in a telegram to the presidents of the Midvale Steel & Ordnance Company, Republic Iron & Steel Company, Lackawanna Steel Company, Inland Steel Company, Youngstown Sheet & Tube Company, Steel & Tube Company of America, Brier Hill Steel Company, and the Bethlehem Steel Corporation, asking them to submit to the Federal Trade Commission full and specific information as to the plan of the proposed merger before the plan is consummated or actual transfers made.

In this connection the commission states that the proposed merger was called formally to its attention on December 27, 1921, and that the matter has been under investigation since that time.

RETURNS OF CLASS I RAILROADS FOR MARCH

	March		Three Months	
	1922	1921	1922	1921
Average miles op.	235,228.61	234.830.99	235,216.17	234,828.18
Revenues:				
Freight	$353,907,732	$320,774,338	$925,329,037	$930,293,438
Passenger	[1]80,530,876	[2]97,312,871	[3]237,846,211	[4]291,037,569
Mail	7,737,198	9,701,457	22,102,126	25,838,302
Express	9,359,312	6,983,840	22,180,006	18,883,711
Other transp.	14,232,616	12,905,317	38,314,523	38,073,984
Incidental	8,187,109	10,908,672	24,006,941	30,824,225
Joint facility—Cr.	888,484	659,737	2,277,199	1,972,002
Joint facility—Dr.	173,698	197,906	524,660	593,412
Ry op. revenues	474,669,629	459,048,326	1,271,531,383	1,336,329,819
Expenses:				
Maint. way	53,239,401	61,599,020	148,483,774	175,756,736
Maint. equip	106,133.335	107,753,561	291,672,815	339,967,214
Traffic	7,176,990	7,346,469	21,141,967	21,736,991
Transp.	177,560,910	204,799,420	512,259,655	633,923,834
Misc. operations	3,762,709	4,191,282	10,965,046	12,742,551
General	13,522,128	14,913,222	39,708,063	44,264,982
Transp for inv.—Cr.	467,031	491,787	1,312,785	1,447,002
Ry. op. exp.	360,928,442	400,111,187	1,022,918,535	1,226,945,306
Net rev. ry. op.	113,741,187	58,937,139	248,612,848	109,384,513
Ry. tax accruals	24,522,666	22,134,085	69,704,472	65,519,023
Uncollectible	133,469	81,016	305,680	227,270
Ry. op. income	89,085,052	36,722,038	178,602,696	43,638,220
Eq. rents—Dr. bal.	4,244,630	4,117,505	13,402,222	10,883,334
J. fac. rent—Dr. bal.	1,329,014	1,797,468	4,201,045	5,18[illegible],479
Net ry. op. inc.	83,511,408	30,807,065	160,999,429	27,574,407
Pct. of expenses	76.04	87.16	80.45	91.81

[1]Includes $2,577,810, sleeping and parlor car surcharge.
[2]Includes $2,873,349, sleeping and parlor car surcharge.
[3]Includes $6,949,603, sleeping and parlor car surcharge.
[4]Includes $7,634,864, sleeping and parlor car surcharge.

Operating Statistics of Large Steam Roads—Selected Items for the Month of March, 1922,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany 1922	394	261,266	282,418	32,573	4,953	65.7	259,923	102,381	114	28	19.9	...
1921	394	245,063	265,024	30,843	4,383	63.2	242,972	98,792	122	28	18.8	...
Boston & Maine 1922	2,455	582,200	650,115	56,388	12,489	68.1	657,197	267,146	320	136	29.7	31
1921	2,469	528,993	588,602	56,960	10,607	66.6	584,925	246,386	344	116	25.2	62
N. Y., N. H. & H. 1922	1,960	468,303	514,626	30,700	12,040	68.9	615,767	262,010	286	76	21.0	18
1921	1,959	457,981	492,227	32,812	10,254	66.8	542,974	234,100	298	73	19.7	27
Great Lakes Region:												
Delaware & Hudson Co. 1922	887	424,693	569,839	44,404	10,734	60.5	733,644	367,065	281	41	12.8	84
1921	880	360,541	477,570	33,731	8,475	58.6	585,381	290,005	277	35	11.1	90
Delaware, Lacka. & West'n. 1922	994	544,654	682,154	135,032	16,658	70.3	901,633	420,175	297	63	17.5	9
1921	995	500,996	615,991	118,608	14,860	67.1	841,751	394,679	333	47	12.4	60
Erie (inc. Chic. & Erie) 1922	2,309	988,724	1,132,228	46,513	31,780	64.9	1,917,785	895,249	549	216	28.2	27
1921	2,259	941,628	1,051,137	51,797	27,773	62.1	1,751,365	800,201	563	149	21.0	76
Lehigh Valley 1922	1,316	618,517	686,960	74,417	17,657	64.5	1,077,694	504,534	410	133	24.4	99
1921	1,431	524,728	579,199	52,756	14,000	61.7	870,208	402,144	403	129	24.2	116
Michigan Central 1922	1,827	539,553	552,895	22,224	16,828	66.1	897,606	362,038	316	94	23.0	71
1921	1,829	438,646	455,279	15,753	12,462	62.1	686,993	274,414	329	90	21.4	90
New York Central 1922	5,675	1,948,635	2,198,782	134,155	93,067	62.9	3,986,962	1,738,070	1,056	546	34.1	245
1921	5,655	1,663,015	1,802,905	135,055	53,697	61.6	3,169,363	1,357,675	1,140	498	30.4	355
N. Y., Chic. & St. L. 1922	510	347,290	348,418	668	11,596	69.4	584,265	235,741	117	32	21.7	42
1921	510	332,083	332,831	568	9,408	65.3	499,362	198,278	110	58	34.5	33
Pere Marquette 1922	2,191	355,032	369,881	6,844	9,424	66.5	532,645	228,065	159	52	24.8	14
1921	2,207	283,977	291,362	5,506	6,814	62.8	363,630	172,395	171	37	17.9	30
Pitts & Lake Erie 1922	228	120,428	124,398	1,108	4,049	59.5	296,799	166,649	62	18	22.2	7
1921	225	80,635	90,119	608	2,711	61.8	197,748	110,834	67	12	15.0	23
Wabash 1922	2,418	648,154	682,891	8,106	17,594	70.0	952,606	420,514	260	80	23.5	11
1921	2,418	541,633	567,344	5,706	14,983	67.7	808,593	342,916	272	71	20.7	38
Ohio-Indiana-Allegheny Region:												
Baltimore & Ohio 1922	5,235	1,879,642	2,194,382	141,881	48,742	64.8	3,076,364	1,554,597	932	452	32.7	91
1921	5,185	1,606,146	2,002,953	105,653	36,974	59.1	2,404,102	1,126,325	1,011	389	27.8	220
Central of N. J. 1922	689	299,644	336,565	44,249	7,168	59.9	476,663	237,831	213	38	15.0	9
1921	679	260,815	286,954	33,306	5,542	57.7	381,721	189,089	214	50	19.0	19
Chicago & Eastern Ill. 1922	945	233,486	234,773	3,763	5,684	63.7	345,754	174,596	117	52	30.6	33
1921	1,131	207,215	208,424	3,814	4,657	62.7	276,909	133,739	118	55	31.6	34
C., C., C. & St. L. 1922	2,387	713,316	751,611	4,334	20,155	59.7	1,279,208	596,712	320	133	29.3	5
1921	2,396	643,678	680,539	3,591	16,297	57.0	1,065,808	481,924	320	115	26.4	59
Elgin, Joliet & Eastern 1922	459	125,941	140,690	9,792	3,805	65.6	291,917	153,858	93	16	14.9	24
1921	456	103,296	115,410	8,527	2,971	69.1	217,582	120,148	101	10	8.6	28
Long Island 1922	394	47,846	52,553	9,155	639	61.3	36,559	14,387	40	7	14.5	1
1921	395	42,891	50,262	8,402	549	63.0	29,766	11,494	35	8	18.8	3
Pennsylvania System 1922	10,882	4,515,323	4,955,119	379,025	118,997	63.7	8,004,792	3,982,471	2,577	847	24.7	515
1921	10,869	3,869,239	4,224,299	304,852	93,646	61.6	6,390,121	3,170,878	2,518	717	22.2	795
Phila. & Reading 1922	1,119	648,259	721,084	82,654	15,980	61.7	1,105,224	582,551	351	77	18.0	121
1921	1,118	491,435	555,427	68,339	11,635	60.5	802,401	417,259	341	87	20.3	101
Pocahontas Region:												
Chesapeake & Ohio 1922	2,548	836,665	933,252	22,184	24,653	56.6	1,932,162	1,045,578	439	114	20.7	34
1921	2,543	638,487	694,505	18,411	17,393	56.4	1,301,919	674,950	453	107	19.1	83
Norfolk & Western 1922	2,228	864,834	1,049,430	41,070	24,303	57.8	1,890,140	1,014,237	590	110	15.7	184
1921	2,210	609,173	736,536	25,204	15,672	59.2	1,192,069	631,195	632	140	18.1	272
Southern Region:												
Atlantic Coast Line 1922	4,924	729,852	742,609	12,364	17,243	62.5	885,852	323,775	281	103	26.8	20
1921	4,888	732,391	734,999	11,879	16,007	62.0	845,839	317,809	302	119	28.3	2
Central of Georgia 1922	1,908	225,083	227,412	2,936	5,296	76.8	257,004	117,768	114	24	17.6	8
1921	1,908	238,928	240,659	2,125	4,816	70.1	255,962	117,930	100	24	19.4	...
I. C. (inc. Y. & M. V.) 1922	6,137	1,714,816	1,723,718	35,680	45,273	62.5	2,834,570	1,266,204	751	94	11.1	41
1921	6,151	1,593,682	1,602,604	28,855	37,951	63.1	2,398,662	1,071,841	745	103	12.1	26
Louisville & Nashville 1922	5,021	1,617,696	1,731,265	67,120	28,715	61.4	1,860,623	898,787	582	96	14.1	11
1921	5,026	1,417,797	1,508,970	53,024	23,404	59.7	1,496,141	688,958	543	115	17.5	28
Seaboard Air Line 1922	3,537	477,013	487,499	9,434	10,661	67.4	555,718	217,267	188	75	28.5	...
1921	3,537	445,247	449,777	6,681	9,039	63.7	489,353	188,094	179	82	31.4	...
Southern Ry. 1922	6,942	1,346,281	1,374,607	33,681	29,489	69.1	1,532,350	650,525	862	188	17.9	23
1921	6,942	1,182,045	1,203,511	26,754	24,876	68.9	1,284,609	536,772	904	216	19.3	94
Northwestern Region:												
C. & N. W. 1922	8,369	1,569,264	1,620,059	16,468	32,395	63.0	1,846,142	759,134	803	228	22.1	28
1921	8,320	1,530,047	1,568,924	18,059	29,051	61.4	1,698,857	657,068	620	331	34.8	4
C., M. & St. P.[1] 1922	11,027	1,721,877	1,783,714	75,063	40,335	65.1	2,341,164	1,066,519	841	206	19.7	59
1921	10,618	1,292,375	1,336,467	61,051	29,620	64.1	1,605,022	688,859	817	262	24.3	134
C., St. P., M. & O. 1922	1,726	327,126	347,531	13,872	6,298	72.4	327,012	141,110	148	63	29.8	22
1921	1,726	305,566	328,402	12,613	5,552	69.3	298,187	129,335	154	51	24.9	28
Great Northern 1922	8,265	785,797	813,952	30,081	20,532	70.4	1,129,136	535,082	575	184	24.2	176
1921	8,164	684,472	704,962	24,823	17,368	73.8	913,981	443,961	608	170	21.8	270
M., St. P. & S. Ste. M. 1922	4,384	485,139	520,389	8,276	10,615	72.5	529,120	244,233	343	61	15.1	28
1921	4,225	460,541	470,228	6,517	9,673	67.6	500,637	226,176	351	49	12.2	53
Northern Pacific 1922	6,414	741,951	777,324	49,747	21,416	75.5	1,129,566	549,530	554	156	22.0	78
1921	6,408	627,970	653,548	43,073	17,504	75.0	931,602	456,375	566	160	22.0	179
Oreg.-Wash. R. R. & Nav. 1922	2,166	192,799	217,036	29,714	4,869	74.7	269,912	132,713	122	38	24.0	2
1921	2,211	183,916	204,973	26,325	4,702	76.0	255,101	129,502	122	42	25.8	9
Central Western Region:												
Atch., Top. & Santa Fe 1922	9,798	1,386,445	1,453,528	68,111	36,364	67.6	2,106,863	809,323	797	158	16.6	223
1921	9,771	1,388,575	1,453,565	66,750	34,565	63.4	1,984,175	752,714	779	170	17.9	130
Chicago & Alton 1922	1,010	353,421	361,241	6,646	7,322	60.5	464,834	211,507	105	43	28.8	4
1921	1,010	312,700	318,227	4,016	5,978	55.4	388,550	170,477	117	45	27.9	13
Chic., Burl. & Quincy 1922	9,326	1,619,200	1,688,778	79,397	42,895	63.1	2,601,518	1,228,925	694	260	27.2	80
1921	9,326	1,427,067	1,486,073	63,746	35,697	62.2	2,139,645	988,666	709	262	27.0	127
Chic., Rock Isl. & Pacific 1922	7,662	1,305,652	1,324,525	9,932	27,980	67.2	1,510,160	636,972	602	149	19.9	61
1921	7,662	1,267,471	1,280,982	11,781	26,451	66.0	1,447,205	607,607	561	177	24.0	44
Denv. & Rio Gr'de West'n. 1922	2,593	218,464	269,369	54,320	4,846	66.1	289,512	140,147	227	84	26.9	39
1921	2,593	170,498	211,539	39,188	3,757	68.7	211,578	102,196	230	82	26.3	56
Oregon Short Line 1922	2,360	344,795	359,772	24,848	8,143	70.9	496,115	249,144	169	58	25.5	29
1921	2,359	278,825	287,399	19,874	6,383	68.6	379,392	185,276	179	48	21.0	43
Southern Pacific 1922	6,983	921,240	1,056,445	187,812	27,046	69.1	1,503,706	629,603	532	204	27.7	37
1921	6,975	1,001,606	1,160,798	219,899	26,574	63.3	1,579,770	646,911	536	217	28.9	35
Union Pacific 1922	3,665	871,847	883,515	38,352	25,626	73.2	1,357,660	597,566	402	134	25.0	81
1921	3,614	704,297	714,002	28,107	22,146	73.1	1,148,713	497,122	407	147	26.6	104
Southwestern Region:												
Gulf, Colo. & Santa Fe 1922	1,895	200,870	209,568	4,423	5,111	65.2	289,590	122,914	122	27	18.1	34
1921	1,895	263,256	268,025	5,729	6,166	63.1	359,051	160,007	100	47	32.0	...
Missouri, Kans. & Tex. 1922	1,658	204,713	204,713	5,769	5,708	60.7	326,183	129,472	140	43	23.6	73
1921	1,710	228,569	228,736	7,718	5,707	60.9	326,652	131,590	125	50	28.4	39
Mo., Kans. & Tex. of Tex. 1922	1,738	188,145	192,573	2,112	3,754	58.4	224,910	87,410	86	52	37.5	21
1921	1,740	253,867	258,595	3,936	4,716	60.2	287,913	120,577	109	46	29.9	19
Missouri Pacific 1922	7,305	1,085,666	1,094,243	29,856	26,557	68.7	1,507,969	699,231	422	160	27.4	1
1921	7,263	1,041,021	1,050,694	30,519	22,776	66.5	1,293,649	577,352	351	178	33.6	2
St. Louis-San Francisco 1922	4,761	780,266	789,464	13,019	14,253	66.3	807,638	354,825	345	110	24.1	27
1921	4,761	753,224	764,774	13,194	12,770	62.1	738,691	309,132	352	157	30.9	40
Southern Pacific Lines (In. 1922	3,710	553,894	557,414	4,783	11,449	65.2	663,118	291,095	184	93	33.7	10
Texas and Louisiana)[2] 1921	3,647	653,632	656,982	5,427	11,942	59.9	757,625	328,761	184	113	38.0	...
Texas & Pacific 1922	1,953	240,777	240,893	2,482	5,438	65.1	300,261	119,864	113	87	43.4	19
1921	1,947	300,155	300,155	5,132	5,858	58.7	352,751	133,986	112	82	42.1	10

[1] Includes Chicago, Terre Haute & Southeastern from July 1, 1921, only.
[2] Includes Galveston, Harrisburg & San Antonio, Houston & Shreveport, Houston & Texas Central, Houston East & West Texas, Iberia & Vermilion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. R.R. & S.S. Co., and Texas & New Orleans.

Compared with March, 1921, for Roads with Annual Operating Revenues above $25,000,000.

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotive and tender	Passenger service: Train-miles	Passenger-train car-miles
New England Region:														
Boston & Albany 1922	3,535	4,993	8,533	6.0	840	995	392	20.7	387	28.5	8,384	209	305,044	1,957,708
1921	3,323	4,699	8,022	6.6	1,383	991	403	22.5	397	27.9	8,090	208	319,833	2,012,683
Boston & Maine 1922	16,914	14,763	31,677	18.4	845	1,129	459	21.4	272	18.7	3,510	162	820,056	4,412,369
1921	17,257	14,913	32,170	16.3	3,934	1,106	466	23.2	247	16.0	3,220	162	866,106	4,570,199
N. Y., N. H. & H....1922	24,211	16,692	40,903	23.6	743	1,315	559	21.8	207	13.8	4,313	165	999,990	6,123,598
1921	24,495	16,978	41,473	14.4	5,563	1,186	511	22.8	182	11.9	3,854	182	1,096,824	6,695,353
Great Lakes Region:														
Delaware & Hudson 1922	10,123	6,700	16,823	8.3	245	1,727	864	34.2	704	34.0	13,350	196	192,790	975,147
1921	11,976	5,088	17,064	8.7	1,236	1,624	804	34.2	548	27.3	10,626	201	187,876	974,005
Delaware, Lackawanna & Western 1922	15,939	6,693	22,632	11.6	6	1,655	771	25.2	599	33.8	13,635	191	493,539	3,418,033
1921	16,216	7,862	24,078	7.8	893	1,680	788	26.6	529	29.7	12,801	179	493,254	3,522,313
Erie (inc. Chic. & Erie) 1922	38,215	17,553	55,768	19.0	5,275	1,940	905	28.2	518	28.3	12,505	154	676,079	4,721,971
1921	35,223	15,996	51,219	16.2	10,809	1,860	850	28.8	504	28.2	11,428	162	674,803	5,078,290
Lehigh Valley 1922	30,374	9,206	39,580	10.7	3,254	1,742	816	28.6	411	22.3	12,364	169	345,655	2,549,482
1921	29,297	10,318	39,615	11.6	2,725	1,658	766	28.7	327	18.5	9,068	196	362,789	2,718,428
Michigan Central 1922	17,855	12,792	30,647	18.7	27	1,664	671	21.5	381	26.8	6,394	132	554,138	4,879,084
1921	17,892	10,378	28,270	13.7	2,442	1,566	626	22.0	313	22.9	4,839	139	575,571	5,041,239
New York Central 1922	80,381	48,235	128,616	19.3	3,350	2,046	892	25.5	436	27.1	9,879	129	2,335,128	17,913,915
1921	84,295	51,960	136,255	9.6	26,513	1,906	816	25.3	321	20.6	7,745	133	2,344,930	17,792,860
N. Y., Chic. & St. L. ..1922	4,505	4,898	9,403	8.7	986	1,682	679	20.3	809	57.3	14,904	114	86,732	497,216
1921	5,857	4,223	10,080	15.3	1,439	1,504	597	21.1	635	46.1	12,536	126	84,094	524,328
Pere Marquette 1922	10,668	11,051	21,719	14.0	1,000	1,500	642	24.2	339	21.1	3,358	132	252,891	1,242,956
1921	10,418	7,139	17,557	11.3	1,850	1,281	607	25.3	317	19.9	2,520	165	285,656	1,370,882
Pitts. & Lake Erie.....1922	19,817	8,244	28,061	39.4	101	2,465	1,384	41.2	192	7.8	23,586	85	110,819	559,707
1921	16,377	8,492	24,869	11.6	4,585	2,452	1,375	40.9	144	5.7	15,916	90	113,989	580,787
Wabash 1922	12,266	10,277	22,543	12.1	596	1,470	649	23.9	602	36.0	5,610	170	550,030	2,873,416
1921	12,857	10,215	23,072	11.0	898	1,493	633	22.9	479	30.9	4,575	171	522,953	2,689,864
Ohio-Indiana-Allegheny Region:														
Baltimore & Ohio 1922	69,810	34,297	104,107	15.2	7,503	1,637	827	31.9	482	23.3	9,579	189	1,459,900	9,202,852
1921	67,773	30,971	98,744	9.3	5,570	1,497	701	30.5	368	20.4	7,008	197	1,395,295	8,908,047
Central of N. J. 1922	19,428	8,377	27,805	5.4	6,557	1,591	794	33.2	276	13.9	11,136	177	329,926	1,555,675
1921	18,971	10,001	28,972	23.7	3,969	1,464	725	34.1	211	10.7	8,990	216	324,321	1,489,909
Chicago & Eastern Ill. ..1922	15,343	3,175	18,518	11.2	2,807	1,481	748	30.7	304	15.5	5,959	182	221,394	1,479,900
1921	15,970	3,537	19,507	10.2	5,150	1,336	645	28.7	221	12.3	3,815	194	241,426	1,531,010
C., C., C. & St. L. 1922	15,694	16,960	32,654	13.7	1,027	1,793	837	29.6	589	33.3	8,065	139	682,113	4,215,824
1921	19,055	16,878	35,933	10.3	5,351	1,656	749	29.6	433	25.7	6,488	145	751,300	4,746,157
Elgin, Joliet & Eastern...1922	9,238	5,095	14,333	9.3	327	2,318	1,222	40.4	346	13.0	10,806	138	(1)	(1)
1921	10,409	4,615	15,024	5.6	3,508	2,106	1,163	40.4	258	9.2	8,493	148	(1)	(1)
Long Island 1922	2,341	4,293	6,634	4.4	390	764	301	22.5	70	5.1	1,177	344	192,029	1,034,860
1921	1,795	3,183	4,978	4.2	655	694	268	20.9	74	5.6	940	376	195,765	1,024,482
Pennsylvania System ...1922	212,253	70,562	282,815	13.3	31,593	1,773	882	33.5	454	21.3	11,806	149	4,940,645	32,608,777
1921	206,566	71,139	277,705	5.9	87,478	1,652	820	33.9	368	17.7	9,411	155	5,125,229	34,032,018
Phila. & Reading.....1922	23,282	14,717	37,999	5.4	1,309	1,705	899	36.5	495	22.0	16,788	181	489,848	2,186,922
1921	27,103	12,898	40,001	9.9	6,448	1,633	849	35.9	336	15.5	12,034	204	531,241	2,395,794
Pocahontas Region:														
Chesapeake & Ohio.....1922	36,338	12,902	49,240	14.4	772	2,309	1,250	42.4	685	28.5	13,238	137	446,880	2,414,302
1921	37,437	11,697	49,134	7.3	11,448	2,039	1,057	38.8	443	20.2	8,564	144	447,039	2,463,185
Norfolk & Western 1922	30,771	7,685	38,456	5.5	1,563	2,186	1,173	41.7	851	35.2	14,686	174	390,810	2,349,528
1921	38,351	6,740	45,091	7.0	13,859	1,957	1,036	40.3	452	18.9	9,213	180	391,116	2,418,188
Southern Region:														
Atlantic Coast Line 1922	22,552	11,477	34,029	13.2	.....	1,214	444	18.8	307	26.1	2,121	124	879,110	6,445,815
1921	21,814	12,232	34,046	13.7	.....	1,155	433	19.8	301	24.4	2,097	142	909,386	6,572,908
Central of Georgia 1922	4,032	4,229	8,261	14.4	.....	1,142	523	22.2	460	26.9	1,991	150	325,619	1,730,750
1921	4,544	4,120	8,664	18.9	.....	1,071	494	24.5	439	25.6	1,994	160	324,254	1,637,596
I. C. (inc. Y. & M. V.)..1922	43,164	21,238	64,402	8.0	7,598	1,653	738	28.0	634	36.3	6,656	152	1,475,558	8,561,078
1921	45,085	17,949	63,034	6.6	10,943	1,505	673	28.2	549	30.8	5,621	153	1,472,422	8,993,298
Louisville & Nashville ...1922	37,430	14,810	52,240	11.0	74	1,150	556	31.3	555	28.9	5,774	185	1,030,175	5,966,361
1921	38,415	15,750	54,165	19.5	111	1,055	486	29.4	410	23.4	4,422	182	964,202	5,334,038
Seaboard Air Line.....1922	12,894	11,437	24,331	29.7	.....	1,165	456	20.4	288	21.0	1,981	181	655,880	3,771,691
1921	11,005	9,133	20,138	16.9	.....	1,099	422	20.8	301	22.7	1,715	187	627,931	3,864,076
Southern Ry. 1922	38,745	20,236	58,981	16.5	.....	1,136	483	22.1	356	23.3	3,023	205	1,314,776	7,417,170
1921	38,875	22,609	61,484	8.2	7,440	1,087	454	21.6	282	19.0	2,494	215	1,390,653	8,481,133
Northwestern Region:														
C. & N. W. 1922	45,362	26,216	71,578	7.6	4,200	1,176	484	23.4	342	23.2	2,926	191	1,596,290	9,595,516
1921	47,748	25,489	73,237	7.5	5,500	1,110	429	22.6	289	20.9	2,548	202	1,689,715	10,020,020
C., M. & St. P.1.....1922	49,340	27,538	76,878	15.2	.....	1,360	619	26.4	448	26.8	3,120	180	1,486,610	8,720,845
1921	44,406	18,441	62,847	9.8	4,871	1,242	533	23.3	354	23.7	2,093	182	1,479,486	8,827,921
C., St. P., M. & O. 1922	3,582	10,852	14,434	14.2	627	1,000	431	22.4	315	19.4	2,637	190	313,663	1,719,187
1921	3,722	11,390	15,112	10.4	1,950	976	423	23.3	276	17.1	2,417	197	323,439	1,807,827
Great Northern 1922	44,884	5,996	50,880	13.4	.....	1,437	681	26.1	339	18.5	2,088	186	992,954	5,698,956
1921	44,586	9,590	54,176	13.3	.....	1,335	649	25.6	264	14.0	1,754	193	1,003,570	5,838,112
M. St. P. & S. Ste. M....1922	18,593	5,758	24,351	12.8	1,409	1,091	503	23.0	324	19.4	1,797	149	437,935	2,371,966
1921	16,705	8,332	25,037	10.3	2,420	1,087	491	23.4	291	18.4	1,727	149	442,217	2,255,937
Northern Pacific 1922	35,384	7,067	42,451	10.5	1,219	1,522	741	25.7	418	21.6	2,764	148	848,575	5,299,690
1921	36,277	8,776	45,053	12.0	11,978	1,484	727	26.1	327	16.7	2,298	146	849,043	5,224,493
Oreg.-Wash. R.R. & Nav..1922	6,217	2,886	9,103	3.3	2,898	1,400	688	27.3	470	23.1	1,976	231	254,515	1,641,974
1921	4,297	3,936	8,233	5.1	2,204	1,387	704	27.5	507	24.2	1,889	228	258,968	1,685,127
Central Western Region:														
Atch., Top. & Santa Fe.1922	48,196	11,597	59,793	8.2	10,810	1,520	584	22.3	437	29.0	2,665	152	1,618,495	12,007,339
1921	47,326	13,313	60,639	9.1	11,406	1,429	542	21.8	400	29.0	2,485	158	1,823,191	13,275,752
Chicago & Alton 1922	9,491	4,852	14,343	3.6	800	1,315	598	28.9	476	27.2	6,754	196	274,180	1,574,003
1921	9,209	4,945	14,154	5.0	.....	1,243	545	28.5	389	24.6	5,444	205	295,736	1,651,478
Chic., Burl. & Quincy...1922	45,071	18,814	63,885	7.9	78	1,607	759	28.6	621	34.3	4,251	166	1,461,168	9,095,090
1921	48,025	19,627	67,652	10.9	4,577	1,499	693	27.7	471	27.4	3,420	166	1,536,414	9,790,390
Chic., Rock Isl. & Pacific.1922	32,628	14,788	47,416	9.4	5,643	1,157	488	22.8	433	28.3	2,682	188	1,297,981	7,237,221
1921	29,994	16,681	46,675	10.3	9,155	1,142	479	23.0	420	27.7	2,558	185	1,358,143	7,703,322
Denver & Rio Grande Western 1922	12,770	3,073	15,843	14.1	1,824	1,325	642	28.9	285	14.9	1,743	221	228,650	1,526,571
1921	13,235	2,544	15,779	7.4	4,306	1,241	569	27.2	209	11.2	1,271	241	230,271	1,589,893
Oregon Short Line.....1922	6,190	3,399	9,589	6.8	595	1,439	723	30.6	838	38.7	3,406	150	285,097	1,952,525
1921	7,916	3,491	11,407	6.0	3,370	1,361	664	29.0	524	26.3	2,534	147	299,462	2,065,707
Southern Pacific 1922	23,335	17,033	40,368	6.8	4,139	1,632	683	23.3	503	31.1	2,906	158	1,312,498	10,138,206
1921	20,868	17,336	38,204	10.6	4,173	1,577	646	24.3	546	35.3	2,992	161	1,392,229	10,910,473
Union Pacific 1922	17,889	7,083	24,972	13.0	2,766	1,557	685	23.3	772	45.2	5,259	164	860,822	6,688,362
1921	19,683	8,354	28,037	13.9	6,423	1,631	706	22.4	572	34.9	4,437	165	862,068	7,117,513
Southwestern Region:														
Gulf, Colo. & Santa Fe..1922	7,913	3,298	11,211	4.9	854	1,442	612	24.1	354	22.5	2,093	152	193,846	1,099,208
1921	9,425	4,102	13,527	4.7	2,090	1,364	608	25.9	382	23.3	2,725	147	195,358	1,113,231
Missouri, Kans. & Texas.1922	8,823	5,180	14,003	7.3	3,946	1,593	632	22.7	298	21.7	2,518	153	265,620	1,949,039
1921	8,812	5,020	13,832	8.6	2,758	1,429	576	23.1	307	21.8	2,482	155	278,781	2,194,085
Mo., Kans. & Tex. of Tex.1922	368	11,021	11,389	7.1	3,184	1,195	465	23.3	248	18.2	1,623	170	267,105	1,515,560
1921	305	12,215	12,520	3.7	950	1,134	475	25.6	311	20.2	2,236	169	279,857	1,858,837
Missouri Pacific 1922	32,608	18,555	51,163	9.6	1,946	1,389	644	26.3	441	24.4	3,088	163	952,574	5,557,892
1921	32,472	17,626	50,098	6.5	6,171	1,243	555	25.3	372	22.1	2,564	164	943,068	5,580,315
St. Louis-San Francisco.1922	20,510	8,788	29,298	8.4	.....	1,035	455	24.9	391	23.7	2,404	199	746,609	4,160,642
1921	20,822	10,934	31,756	7.8	.....	981	410	24.2	314	20.9	2,095	214	775,305	4,402,670
Southern Pacific Lines..1922	9,060	13,221	22,281	11.8	2,026	1,197	526	25.4	421	25.4	2,531	137	542,137	3,476,663
(In Texas and Louisiana.)2 1921	8,693	16,132	24,825	10.0	3,600	1,159	503	27.5	427	25.9	2,908	141	542,752	3,529,123
Texas & Pacific 1922	6,486	5,047	11,533	18.3	.....	1,247	498	22.0	335	23.4	1,980	157	296,650	1,920,248
1921	5,796	6,628	12,424	14.0	.....	1,175	446	23.0	348	25.8	2,220	151	316,966	2,026,365

Compiled by the Bureau of Statistics, Interstate Commerce Commision. Subject to revision.

Railroad Officers Before House Committee

Howard Elliott, chairman of the Northern Pacific, was the first witness on behalf of the railroads at Washington on May 16 at the hearing before the House committee on interstate and foreign commerce on the Hoch and Sweet bills which, like the Capper bill in the Senate, propose to amend the transportation act to restore the powers of the state railroad commissions, whose representatives had previously appeared in support of the bill. Mr. Elliott urged the importance of dealing with the railroads as a national system and pointed out that the Interstate Commerce Commission and the state commissions have recently adopted a plan of co-operation in cases of conflicting jurisdiction.

The committee had postponed consideration of the mileage book bill for two weeks in the hope that the Interstate Commerce Commission would issue its rate decision. Before taking up the Hoch and Sweet bills there was an argument among the members of the committee on a motion to postpone consideration of the mileage book, subject to the call of the chairman. It was finally decided to postpone the discussion until Wednesday.

The hearing in the general railroad investigation before the Senate committee, at which L. F. Loree and R. S. Lovett were to appear on Thursday and Friday, has been postponed because Chairman Cummins has gone to Hot Springs for his health.

Safety at Highway Crossings

Using cards furnished by the railroads of the State, the Department of Highways of Tennessee has this year sent out with each automobile license a warning notice designed to inculcate the habit of caution at railroad crossings. The warning, copied below, is on a tag, 2½ in. by 5 in., which is provided with a string, like a tag for a bag, enabling the recipient to conveniently fasten it in front of his seat in the automobile.

It appears that a law requiring automobiles to be stopped before crossing a track has been on the statute book in Tennessee since March 12, 1917, and this law is printed on the back side of this tag. It prescribes a penalty of from $1 to $10 for violation. Unlike the Virginia law, recently noticed, this Act applies only to motor vehicles, but it applies to all railroad tracks except at crossings where a watchman is in attendance.

So far as can be learned, this statute has been little more than a dead letter; this action in 1922, full five years since the law was passed, appears to have been the first important step that has been taken looking to its observance.

AUTO DRIVERS:

In the interest of human safety and in the prevention of needless waste of human lives and the unnecessary destruction of property, you are earnestly urged to be on your guard at all times and under all circumstances, when approaching railroad crossings at grade. The toll of human lives and bodily injuries on account of careless and inattentive drivers of automobiles, is alarming. Usually the accident occurs when your attention is distracted or when you "take a chance."

Respect for the law should be observed by all citizens.

Department of Highways, State of Tennessee.

ATTACH THIS TAG INSIDE YOUR CAR WHERE IT WILL BE SEEN.

Action looking to greater safety at crossings has been taken in two other states, Pennsylvania and New York; the Public Service Commissions have issued orders requiring common carriers by automobile to establish rules requiring a stop before passing over a railroad. In Pennsylvania the rule applies to "carriers of passengers or property," and the stop is to be made within 75 ft. The driver must look carefully in each direction. The order does not apply to electric street railways within cities and boroughs. Disobedience of the order may be considered by the Commission as sufficient ground for revoking the certificate of public convenience under which the automobile is operated.

The New York order, issued on April 13, is of similar intent, the stop being required to be made not less than 20 ft. and not more than 50 ft. from the crossing. In both of these states the operation of automobiles as common carriers is lawful only after the issuance by the Public Service Commission of a certificate of public convenience and necessity.

Traffic News

The St. Louis-San Francisco and the Chicago, Rock Island & Pacific will on May 27 put on through sleeping cars between Memphis, Tenn., and Denver, Colo.

Associated Traffic Clubs of America

This is the name of an organization formed at Chicago on May 17, by 50 delegates representing 35 of the principal traffic clubs of the country. The following officers were elected for the ensuing year: President, W. J. L. Banham, general traffic manager, Otis Elevator Company, New York City; first vice-president, S. S. Butler, freight traffic manager, St. Louis-San Francisco; second vice-president, T. T. Webster, general traffic manager, of G. H. Mead Company, Dayton, Ohio; third vice-president, George S. Harlan, assistant general freight agent, Baltimore & Ohio; fourth vice-president, R. H. Schultz, traffic manager, San Antonio, Uvalde & Gulf; secretary, B. L. Birkholz, general agent El Paso & Southwestern, New York City. Four directors were elected to serve for one year, the same number for two years and likewise for three years.

From communications received it was stated at this meeting that a large majority of the city traffic clubs have signified their willingness to become members of the national organization.

Coal Production

Production of soft coal increased at the beginning of the sixth week of the strike (May 8-13), according to the weekly bulletin of the Geological Survey, probably to about 4½ million tons. Production of anthracite, however, remains practically zero.

The revised figures for the fifth week (May 1-6) show 4,161,000 tons of bituminous coal, and 6,000 tons of anthracite, or some 3,000,000 tons a week (both kinds) short of the 1919 experience. The table of cars loaded shows:

	First week	Third week	Fifth week	Sixth week
Monday	11,445	7,898	11,598	13,045
Tuesday	11,019	10,041	12,160	13,260
Wednesday	11,437	11,088	12,861	13,384
Thursday	11,090	11,193	12,487	13,234
Friday	11,296	11,596	12,778	.....
Saturday	8,888	10,194	11,265	.....

The increase has been general in those districts not affected by the strike. It is especially marked in the Southern and Middle Appalachians and in Western Kentucky. It is due less to resumption of work at mines hitherto closed by the strike than to an increase of activity caused by quickening demand in those fields not affected by the strike order.

Preliminary estimates place the total output of soft coal in April at 15,780,000 tons, much below that of any April in recent years. In fact, the output for the month fell some 3,000,000 tons short of that in November, 1919, when, as now, a general strike of bituminous miners was in progress.

Heavy Shipments of Automobiles

The National Automobile Chamber of Commerce reports very heavy shipments of automobiles for the first four months of this year, compared with last year. Its totals are as follows:

TOTAL AUTOMOBILES SENT OUT BY MANUFACTURERS

	Carloads		Driveaways		Boat	
	1922	1921	1922	1921	1922	1921
January	15,357	6,485	7,479	3,185	143	93
February	19,636	9,986	10,173	7,507	180	99
March	27,380	16,287	16,766	9,939	560	75
April	*30,200	20,187	*22,500	14,197	*3,200	1,619

*Partly estimated.

On this basis it is estimated that 213,000 passenger cars and trucks were produced by all makers in April. This would be an increase of 35 per cent over April, 1921, and 24 per cent over March, 1922. The heaviest shipping previously recorded was in March, 1920, when 29,326 carloads and 57,273 driveaways

and boat shipments were made, and approximately 220,000 cars and trucks produced. Thus April appears to have set a record for rail shipping, due to more adequate car supply, and it is second in number of machines produced in one month.

Calling attention to these figures the Car Service Division of the American Railway Association, in a circular addressed to the railroad, says that in order that continued heavy production at automotive plants may be fully supplied with rail transportation it is highly important that:

(1) Automobile cars be moved promptly, loaded or empty, to owners or nearest automotive producing territory.

(2) Cars be not loaded with freight which takes them out of route.

(3) Automobile cars be not loaded with cement, lime, plaster or other freight that leaves a residue of dust in the car. Many hundreds of automobile cars have been rejected at automobile plants because of dust.

(4) Owners give special attention to the repair of automobile cars.

Increase in Parcel Post Rates Foreshadowed

The necessity for an increase in the rates for parcel post is indicated in a letter written by Postmaster General Work to the Interstate Commerce Commission, stating that the department is proceeding in conjunction with the joint commission on postal service to secure the necessary data and to make an estimate as to the revenue derived from the several classes of mail matter, the cost of carrying and handling them, and the profit or loss per pound. When these results are known the postmaster general proposes to present them to the commission so far as parcel post matter is concerned with appropriate recommendation for changes in rates of postage, as contemplated by the act of 1912. The law establishing the parcel post system was passed in 1912 and provided rates based in a measure upon the estimated cost of carrying and handling such matter in the mails. These rates, the letter says, were based upon estimated cost of transporting and handling fourth class mail matter under conditions existing during 1908-1911. As most of the expenses for conducting the postal service are common to all classes of mail matter estimates for individual classes must be based upon apportionments of such common expenses; and these largely upon the relative weights of the several classes.

In 1907 fourth class matter was 4.79 per cent (estimated) of the total weight of all mail matter. It is estimated that at present fourth class, or parcel post matter, is approximately 60 per cent of the weight of the entire mails.

Not only have conditions changed, the rates per unit of service for railroad transportation and for all other transportation and the salaries of the postal employees in the field, including those in the post offices, the railway mail service, and the rural delivery service, have all been greatly increased in recent years and since the inauguration of the parcel post system under the rates above mentioned.

In the case of the pay for railroad mail transportation, the Interstate Commerce Commission's order of 1919 increased those rates approximately 60 per cent. The salary legislation of Congress, including the acts passed during the war-period and the reclassification act, increased salaries very materially. As the revenues received from parcel post matter are produced by rates fixed by the act of 1912, then estimated to be little more than sufficient to cover the cost of performing the service, it is obvious that the revenue now received on such matter must be far below the actual and apportioned cost for that service under the conditions now existing.

THE 1,540 PASSENGER TRAINS that were run by the Monongahela division of the Pennsylvania Railroad in the seventeen days ending with Thursday, May 4, made their running time, without exception. In the month of April, altogether, this record was made on 21 days; and on 13 days all trains arrived at destination on time. This record is considered so fine that the superintendent has issued a special bulletin congratulating the employees who made it. The principal lines of the Monongahela division are those from Pittsburgh to West Brownsville, Pa., 54 miles, with 14 regular passenger trains southbound, and 10 northbound; and the Southwest Branch, 60 miles long, with five trains southbound and four northbound.

Foreign Railway News

South African Railway Employees Help to Suppress Revolt

The recent Rand mine strike in South Africa which became a small revolution was suppressed largely through the efforts of the South African Railways and Harbors Brigade, a military organization of employees of the South African Railways. This body was recently publicly thanked for the part it played in restoring law and order by the prime minister, General Jan C. Smuts.

"Windfall for Egyptian Railways"

Under the above heading the Times (London) Trade Supplement publishes a dispatch from Cairo to the effect that the Egyptian State Railways, which are badly in need of money for maintenance and improvements, have received a check from the British government for 900,000 Egyptian pounds (approximately $4,500,000 at the normal rate of exchange) on account of the part played by this railway in transporting soldiers and supplies during the war. The Times expects this check to result in increased orders for railway equipment and supplies.

Revival of Mexican Railway Project

Plans for building a railroad from Agua Prieta, Sonora, along the northern boundary of Mexico to Guzman, Chihuahua—a distance of 180 miles—have been revived by influential Mexicans, according to Consul F. J. Dyer, Nogales, Mexico. The estimated cost is about $3,250,000, and it is thought that the line can be completed in one year of actual construction work. It is understood that the Mexican government desires to have the road built and may offer a substantial subsidy for its completion. American railway builders will probably take the contract.

British Railways in Argentina Have Bad Year

Labor troubles and a decline in traffic resulting from the world-wide business depression combined to keep the British railways in Argentina from making a particularly good showing during the fiscal year ended June 30, 1921, according to the Railway Gazette (London).

Gross receipts of the more important lines were as follows:

Buenos Aires Great Southern	£8,733,000
Buenos Aires Western	4,145,000
Buenos Aires & Pacific	6,854,000
Central Argentine	9,747,000
Cordoba Central	1,180,000

Gross receipts of all these companies were considerably under those of the previous year. Operating ratios compared with the previous year were:

	1920-21	1919-20
Buenos Aires Great Southern	84.33	69.19
Buenos Aires Western	90.88	69.49
Buenos Aires Pacific	85.68	69.66
Central Argentine	79.82	67.61
Cordoba Central	89.62	78.06
Entre Rios	89.38	80.03

Passenger traffic increased considerably in spite of the falling off in freight business.

To Build New Line in Mexico

Through the financial aid of the government of the state of Durango the Compania del Ferrocarril del Rosario y El Oro will build a railroad which will connect the Durango-Tepehuanes branch of the National Railways of Mexico and the Parral & Durango Railroad. The proposed line will be 60 miles long. Its importance lies in the fact that it will traverse one of the richest mineral and heaviest timbered regions of Mexico; also that it will afford a new and direct rail route between Parral and Durango. The branch line which runs from Durango to Tepehuanes is 136 miles long. The Parral & Durango Railroad has a length of 68 miles. It is asserted that there has been an urgent need for this proposed railroad for many years. Several years ago a

syndicate of mine owners along the route of the line offered a bonus of $150,000 in aid of the project. The concession for building the road has been held by two or more persons at different times but through failure to finance its building the concessions were forfeited. It is stated that several thousand laborers will be employed in the grading and other work connected with the project. The headquarters of the company that has been formed to build the line are at Durango.

Large Expenditures by Indian Railways

An expenditure of $85,000,000 annually for five years was recently recommended by the Indian railway finance committee as a minimum requirement. The estimate calls for 437 locomotives during each of the five years and 62,000 passenger and freight cars over the entire period, according to Consul North Winship, Bombay.

The shortage of cars has checked the coal mining and other industries, and it is proposed to double track many lines, strengthen bridges, remodel yards, and generally make the system equal to the needs of the country's growing traffic.

Danzig Railway Repair Shops and Shipyards to Be Internationalized

The "Danziger Werft" which engages in shipbuilding and car repairing was formerly the property of the German government. Since the war the city government of Danzig has been conducting the enterprise but it is now proposed to turn it over to private capital to be subscribed in several countries, according to Commerce Reports. About 5,000 men are at present employed in the works.

It is proposed to have the railway shops and the shipyards taken over by separate companies, each with a capital of 20 million German paper marks; the stock is to be taken by four groups, the first being the Société des Betignolles, Paris; the second, Cravens & Company, Ltd., Sheffield, England; the third, a group of eight Warsaw banks; and the fourth, not yet formed, a group of Danzig banks and capitalists. Danzig and Polish interests are each to have 20 per cent of the capital stock in each of the companies; in the shipyards company the English group is to have 60 per cent; and the French company is to have 60 per cent of the railway shop stock.

The title to the property, grounds, buildings and equipment is to rest in common with Danzig and Poland. Both states shall, however, be obligated to leave operation of the plants to the companies for a minimum of 45 years and a maximum of 60 years. In order not to displace the majority relationship through the participation of the various groups the shares are to be "blocked."

Both companies shall maintain, under one director general, a community of interest in operations, credits, and profits. The operating community shall consist of a uniform system of bookkeeping, inventory, and balance; valuation of materials when transferred from one plant to the other; exchange of information and patents; placing of building and equipment at disposal; and exchange of personnel. The credit community is based on a bond issue of £300,000, which the English and French participants in the scheme have agreed to underwrite, the bonds to be secured by a mortgage on the buildings and lands of the company.

The profits go first to the establishment of the legal reserve fund; next to the amounts necessary for interest and amortization of the loan; then to the funds for depreciation and replacements. In case a loss instead of a profit is shown by either of the companies, a special common reserve fund must then be created to cover possible losses in the future. Any profits remaining after the above charges have been covered are then divided equally between the two companies, which are authorized to dispose of their respective shares of these profits according to the following schedule: the stockholders are to be paid a 10 per cent dividend; 40 per cent of the remainder is paid to the owners, Danzig and Poland, in lieu of rent, each country receiving half.

The entire plan is subject to the final action of the distribution committee of the Council of Ambassadors, which action must be approved by the Council itself.

The contracts in hand and the business in sight apparently give the new companies good prospects for earnings, and it seems likely that they will be profitable from the start.

Equipment and Supplies

Locomotives

THE CHICAGO & EASTERN ILLINOIS expects to send out inquiries this week for six Pacific type locomotives.

RICHMOND, FREDERICKSBURG & POTOMAC is having repairs made to 8 locomotives at the shops of the American Locomotive Company, Richmond, Va.

THE ERIE has ordered 15 Decapod locomotives from the United States Government. These are part of the locomotives originally built for the Russian government.

PICKANDS MATHER & Co., Cleveland, Ohio, has ordered five 0-6-0 type locomotives from the Lima Locomotive Works, Inc. These locomotives will have 21 in. by 26 in. cylinders; 51 in. driving wheels and a total weight in working order of 160,000 lb.

THE WESTERN MARYLAND is having repairs made at the shops of the Baldwin Locomotive Works to about 20 locomotives, including Pacific, Mallet and Consolidation types and is having 8 locomotives repaired at the shops of the American Locomotive Company, Richmond, Va.

THE SIAM STATE RAILWAYS will receive bids until 2 p. m., September 15 at Bangkok, Siam, for the supply of locomotives and tenders. General Purachatra is commissioner-general, Department of State Railways, Bangkok. Specifications and drawings may be obtained from C. P. Sandberg, 143 Liberty street, New York City.

Freight Cars

THE GRAND TRUNK is inquiring for 250 refrigerator cars.

THE GREAT NORTHERN contemplates buying some additional refrigerator cars.

THE CHILE EXPLORATION COMPANY, New York City, is inquiring for 50, 70-ton ore cars.

THE WABASH will accept bids until May 22 for repairs to 500, 40-ft. box cars and 200, 36-ft. box cars.

THE COWLITZ, CHEHALIS & CASCADE has ordered 10 logging cars from the Pacific Car & Foundry Company.

THE MIDLAND TERMINAL RAILWAY COMPANY is inquiring for from 15 to 20 side dump cars of 70 tons' capacity.

THE SAN DIEGO & ARIZONA is inquiring for 10 all-steel, drop-bottom gondolas, 10 all-steel, tight bottom gondolas and 4 steel-underframe stock cars.

THE KANSAS, OKLAHOMA & GULF contemplates buying 100 composite gondola car bodies, 150 composite flat bottom gondola cars and 250 general service gondola cars.

THE AMERICAN REFRIGERATOR TRANSIT COMPANY, noted in the *Railway Age* of April 8 as inquiring for 2,000 refrigerator cars, has ordered this equipment from the American Car & Foundry Co.

THE SOUTHERN has ordered 500, 40-ton automobile box cars from the Standard Steel Car Company and 250 caboose cars from the Lenoir Car Works. This is in addition to the 5,390 cars ordered by this company and reported in the *Railway Age* of May 13.

THE MISSOURI, KANSAS & TEXAS, noted in the *Railway Age* of April 22 as inquiring for 300 flat cars of 40 tons capacity and in the issue of May 13 as inquiring for 1,500 box cars, has ordered the former from the General American Car Company and the latter from the American Car & Foundry Company. The same company also ordered 500 automobile cars from the Mt. Vernon Car Manufacturing Company.

Passenger Cars

THE AURORA, ELGIN & CHICAGO has reopened an inquiry for 20 passenger cars.

THE SAN DIEGO & ARIZONA is inquiring for one combination passenger and baggage car.

THE BOSTON ELEVATED, reported in the *Railway Age* of April 1 as inquiring for 100 cars, has ordered this equipment from the J. G. Brill Company.

THE INTERBORO RAPID TRANSIT COMPANY, reported in the *Railway Age* of May 6 as about to place inquiries for new cars, is now inquiring for 100 cars.

THE COWLITZ, CHEHALIS & CASCADE, noted in the *Railway Age* of April 8 as inquiring for a gasoline propelled motor passenger car, 28 ft. 7½ in. in length, with seating capacity for 41 people and a compartment for baggage, has ordered this equipment from the Skagit Steel & Iron Works of Sedro-Woolley, Wash., the chassis to be furnished by the White Motor Car Company.

THE SOUTHERN RAILWAY was reported in the *Railway Age* of May 13 as having placed orders for 75 cars with the Pullman Company and 25 cars with the American Car & Foundry Company. These include 40 steel passenger coaches, 10 steel combination passenger and baggage cars and 25 steel baggage express cars to be built by the Pullman Company and 25 steel postal cars to be built by the American Car & Foundry Company.

Iron and Steel

THE MOBILE & OHIO has ordered 40,000 pairs of angle bars from the Illinois Steel Company.

THE MISSOURI, KANSAS & TEXAS will accept bids until May 20 for 200, 40-ft. steel underframes for refrigerator cars.

THE SOUTH MANCHURIAN RAILWAY is inquiring through export houses in New York City for 88 boiler and fire-box plates.

THE ILLINOIS CENTRAL has ordered 150 tons of reinforcing bars for grade reduction work at Matteson, Ill., from the Corrugated Bar Company.

THE ALASKAN ENGINEERING COMMISSION has awarded a contract to the United States Steel Products Company for 2,700 tons of steel for the Tenana River bridge.

THE MISSOURI PACIFIC has ordered 26 water tanks and standpipes, involving 700 tons of plates and 300 tons of structural shapes, from the Pittsburg-Des Moines Steel Company.

THE NORFOLK & WESTERN will receive bids until 12 o'clock noon, May 24, at Roanoke, Va., for its requirements of locomotive steel tires July to December, 1922; requirements of wire fencing from May 24, to December 31, 1922; for 400 cast steel truck side frames; also for 200 cast steel side frames.

Track Specialties

THE ATLANTIC COAST LINE is inquiring for 3,000 tons of tie plates.

THE WABASH is inquiring for 500 to 1,000 kegs of spikes and bolts.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS will accept bids for 3,250 kegs of track bolts until May 23.

THE MISSOURI, KANSAS & TEXAS has placed an order for 4,000 kegs of spikes and bolts with the Illinois Steel Company.

THE ERIE has divided an order for 6,000 kegs of railroad spikes between the Jones & Laughlin Steel Company, Pittsburgh, Pa., and another company.

THE PENNSYLVANIA has divided an order for 2,000 kegs of railroad spikes between the Jones & Laughlin Steel Company and Dilworth, Porter & Co., Pittsburgh, Pa. The company also ordered 70,000 track bolts from the Oliver Iron & Steel Co., Pittsburgh.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS, noted in the *Railway Age* of April 22 as inquiring for 198,000 tie plates, has ordered 148,000 from the Inland Steel Company and 50,000 from the Railroad Supply Company.

Machinery and Tools

THE NORFOLK & WESTERN is inquiring for tools for its rail reclaiming plant at Roanoke, Va., including a 6-spindle upright drill; 2 rail drills; a draw cut shaper and a rail bender.

THE CUBA RAILROAD, reported in the *Railway Age* of May 13 as inquiring for machine tools for its new shops at Camaguey, Cuba, has ordered a number of heavy machine tools for use in these shops.

THE WESTERN MARYLAND, reported in the *Railway Age* of May 13 as inquiring for a number of machine tools, has placed orders for the following machines: 36 in. and 48 in. lathes; 6 in. pipe threading machine; 2 in. bolt cutting machine; two 28-in. vertical drilling machines; 5 ft. radial drill; 84 in. boring and turning mill; 36 in. and 42 in. planers; 6 in. car hack saw; 300-ton wheel press and a bushing press.

Miscellaneous

THE ATCHISON, TOPEKA & SANTA FE, it is reported, is in the market for a large quantity of fuel oil.

THE MICHIGAN CENTRAL will accept bids until July 1 for sheets, bars, shapes and plates, billets, springs, axles, tubes, crank pins and piston rods, steel rope and various types of wire.

THE ST. LOUIS-SAN FRANCISCO has contracted with Cosden & Company, the Indiahoma Refining Company, the Producers & Refiners Corporation and the Empire Refiners for supplying 100,000 barrels of fuel oil monthly.

THE WABASH, noted in the *Railway Age* of April 22 as inquiring for 300, 36-in. wheels for passenger coaches, has divided an order for this equipment between the Illinois Steel Company and the Edgewater Steel Company.

THE NEW YORK CENTRAL LINES will receive bids until 12 o'clock noon, May 24, for the requirements of these lines for one year, commencing June 1, 1922, of incandescent lamp bulbs, aggregating $300,000 or more in net value.

Signaling

THE CHICAGO UNION STATION has awarded a contract to the Union Switch & Signal Company for two interlocking plants and complete signal equipment. See item under Railway Construction News.

THE CHICAGO, BURLINGTON & QUINCY is installing automatic signals on 55 miles of line between Napier, Mo., and Pawnee, Nebr., and has ordered the equipment for this work from the Federal Signal Company, Albany, N. Y.

AUTOMOBILE TRUCKING SERVICE, in cities, can be done with electric cars more efficiently than with either gasoline cars or horse-drawn vehicles. This was the declaration of Robert E. M. Cowie, vice-president of the American Railway Express Company, addressing the convention of the National Electric Light Association at Atlantic City, N. J., on May 15. He says that the electric vehicle has not been used much for long distances but is shoving the gas car out into that service and reserving for itself the "infield." His company recently took fifty gas cars out of one city and replaced them with fifty electrics. It uses large numbers of all three types of transportation. The American Railway Express Company is the largest user of electric trucks in the world; of which 123 have been purchased this year. There has not been a year since 1911 in which some electrics were not purchased. The company now operates 1,194 electric street trucks and 250 electric industrial trucks. Mr. Cowie regards the express business as the best business barometer in the country, and he believes he can see the upward trend; that the period of stagnation has passed.

Supply Trade News

The **Foamite Firefoam Company** has removed its office from 200 Fifth avenue to 151 Fifth avenue, New York City.

The McClellan Products Company, Chicago, has recently been organized to handle the McClellan refrigerating machine for installation on railroad cars.

W. E. Mathews has joined the sales organization of the **Lima Locomotive Works, Inc.,** Lima, Ohio. He will devote his entire time to the sale of Shay geared locomotives.

I. L. AuWerter, sales representative of the Carnegie Steel Company in the Michigan territory, has been appointed Michigan district sales manager of the **Apollo Steel Company,** with headquarters at Detroit, Mich.

J. Martin Duncan, follow-up engineer of the **Detroit Steel Casting Company,** Detroit, Mich., has been promoted to general sales manager and **E. R. Young** has been appointed follow-up engineer to succeed Mr. Duncan.

E. P. Waller, assistant manager of the railway department of the **General Electric Company,** Schenectady, N. Y., has been appointed manager of the railway department. **J. G. Barry,** who has heretofore held the positions of general sales manager of the company and manager of the railway department, will in the future devote his entire time and attention to the work of the sales managership. Mr. Waller was born in Martinsville, Va., and was graduated from the Virginia Polytechnic Institute in the class of 1900. Following his graduation he entered the testing department of the General Electric Company at its Schenectady Works. After two years in that department he joined the staff of its publication bureau and later served as associate editor of the General Electric Review. In the fall of 1903 Mr. Waller took up commercial railway work under Mr. Barry and in 1912 he was appointed assistant manager of the railway department, which position he held at the time of his recent appointment as manager of that department.

E. P. Waller

C. E. Allen, manager of the central station division of the **Westinghouse Electric & Manufacturing Company,** with headquarters at Chicago, has been promoted to manager of the St. Louis, Mo., office, with headquarters in the latter city.

Louis F. Vonier, formerly sales engineer of the Federal Bridge & Structural Company, with headquarters at Waukesha, Wis., has been appointed district representative of the **Lyon Metallic Manufacturing Company,** Aurora, Ill. with headquarters at Milwaukee, Wis.

The Illinois Zinc Company, Peru, Ill., has opened a sales office in the McCormick building, 332 So. Michigan avenue, Chicago. The company also has sales offices at 280 Broadway, New York City, and 1331 Filbert street, Philadelphia, Pa. The smelters and rolling mills are located at Peru.

Louis W. Sipley, formerly sales engineer with the Electric Storage Battery Company, Philadelphia, Pa., has been appointed sales engineer for the **Safety Car Heating & Lighting Company,** New York. Mr. Sipley's headquarters are in the Commercial Trust building, Philadelphia. He is a graduate of Bucknell University, holding degrees in both mechanical and electrical engineering. While with the Electric Storage Battery Company, his duties included handling the power plant and railway sales.

The Bucyrus Company, South Milwaukee, Wis., has under way extensive enlargements to its plants at South Milwaukee and at Evansville, Ind. In the South Milwaukee plant, where all the larger machinery is built, a new gray iron foundry is now under construction, 276 ft. in length. The old gray iron foundry is being converted into a cleaning room with annealing ovens, sand blast rooms and a welding room. A large addition is also being made to the steel foundry molding floor, and an electric furnace is being installed. At the Evansville plant which specializes in the manufacture of small revolving shovels the machine and erecting shops are being considerably enlarged.

Charles A. Coffin, of the **General Electric Company,** Schenectady, N. Y., and the **Thomson-Houston Company,** one of its predecessors, and who for 40 years took an active part in the development of these corporations, resigned as chairman of the board on May 16. Mr. Coffin will continue as a director. **Owen D. Young,** vice-president, succeeds Mr. Coffin as chairman, and **Gerard Swope,** president of the International General Electric Company, an affiliated organization, has been elected president. **Anson W. Burchard,** a vice-president of the company, has been elected vice-chairman of the board. The title of honorary chairman has been created for **E. W. Rice, Jr.,** who was president for eight years. The board was increased by the election of **J. R. Lovejoy** and **George F. Morrison,** both long associated with the company as vice-presidents.

Bethlehem Steel Corporation's Purchase of Lackawanna Steel Company

President Grace announced after the meeting of the board of directors of the Bethlehem Steel Corporation on May 16 that the directors had unanimously approved all terms and conditions agreed to in respect to the purchase of the properties and assets of the Lackawanna Steel Company, and took the necessary steps for placing the matter before the stockholders for their consideration.

The purchase price agreed to be paid by Bethlehem is an aggregate par amount of its seven per cent preferred stock and class B common stock equal to the par amount of the stock of Lackawanna outstanding ($35,108,500), consisting of 40 per cent in the seven per cent preferred stock and 60 per cent in the class B common stock of Bethlehem, with an option in Bethlehem to reduce the par amount of the preferred stock and increase the par amount of the class B common stock thus to be delivered by $1,543,400 upon payment of approximately $300,000 in cash. Bethlehem is also to assume the debts and obligations of the Lackawanna.

The Bethlehem stockholders will be requested to authorize the additional stock required for the consummation of the purchase.

No financing is required as a part of the transaction but consideration is being given to providing the monies for the improvement and extension of the consolidated properties to the extent of from $15,000,000 to $25,000,000. Provisions may also be made simultaneously with this financing to provide for the 1923 $11,000,000 Lackawanna bond maturity.

Without reference to the consummation of any public financing it will be the policy at once to authorize the expenditure of $10,000,000 mainly for approving and developing the Lackawanna property which the present management in Lackawanna recognizes should be done.

Although the transaction takes the form of the outright purchase of the Lackawanna properties, the Bethlehem Company announces that Mr. Taylor and other important interests associated with him in the control of the Lackawanna Company will become closely associated with the direction of the consolidated properties and it is expected that they will be liberally represented on the Bethlehem board.

A FINE of $250 was imposed on the proprietor of a shoe shop, at Freeport, Long Island, N. Y., on May 13, for unlawfully renting a commutation ticket of the Long Island Railroad. This is the first conviction secured by the railroad company in its efforts to prevent violations of this new New York law.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was reported in the *Railway Age* of March 11 as contemplating the construction of a new power plant at San Bernardino, California, has authorized the erection of an 80 ft. by 100 ft. structure and has authorized the construction of 75 miles of second track between Yampai, Ariz., and Griffith, reported as contemplated in the *Railway Age* of February 11. The company has also applied to the Interstate Commerce Commission for authority to build a 12-mile line from El Segundo, on the Redondo Branch of the Los Angeles division, to Los Angeles Harbor.

BALTIMORE & OHIO.—During the opening week of May, this company placed contracts for two important pieces of bridgework. One of these involves the structure carrying the tracks of the railroad across East Maiden street, Washington, Penna. This bridge consists of three plate girder spans, with solid floor, total weight of steel about 90 tons. Contract covering the erection, concreting and waterproofing of the new structure was placed with the Seaboard Construction Company, Philadelphia. This railroad has also placed an order with the McClintic-Marshall Company for the fabrication of superstructure steel work for four plate-girder bridges to be installed on its Parkersburg branch, Monongah division, between Grafton and Parkersburg, W. Va. The new structures consist of plate girder spans, ranging in length from 64 to 112 ft., total weight of steel involved about 350 tons. Delivery will be made during July, and the replacement of these structures will be pushed to completion during the present working season.

CHICAGO & NORTH WESTERN.—This company is accepting bids for a 100-ton steel coaling station at Manitowoc, Wisconsin.

CHICAGO, BURLINGTON & QUINCY.—This company, which was reported in the *Railway Age* of April 15 as having closed bids for the construction of a 20 ft. by 60 ft. frame passenger station at Pattensburg, Mo., has awarded the contract for this work to G. A. Johnson, Chicago.

CHICAGO UNION STATION.—This company is calling for bids for the widening of Canal street between Madison and Washington streets, a distance of about 600 ft. It will also call for bids in the near future for the excavating of Canal street between Adams and Jackson. It has awarded a contract to the Union Switch & Signal Company for two interlocking plants and complete signal equipment with the exception of wire, which work will cost approximately $900,000.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company, reported in the *Railway Age* of February 18, as contemplating the construction of approximately 12 miles of second main track from Farmland, Ind., to a point about 2 miles east of Muncie, has awarded the contract for the grading work to the Walsh Construction Company, Davenport, Iowa, and for the concrete bridge and culvert work to the Read Construction Company, Indianapolis, Ind. This company has also under way the replacing of its bridge over the White river on its Evansville, Indianapolis & Terre Haute line, a few miles south of Bloomfield, Ind., with a modern structure consisting of four 100-ft. plate girder spans, a 60-ft. flanking span and 400-ft. of trestle approach, the girders for which have been secured and the masonry work and grading for which are also being done under a contract with the Walsh Construction Company. This company is now securing right of way for and expects to complete the grading and track work this summer by local contract for a 3½-mile cut-off on its Cleveland division between Columbus and Galion, Ohio. It will also replace four steel bridges at various points on its Evansville, Indianapolis & Terre Haute line, other than the White river crossing referred to above.

GREAT NORTHERN.—This company will soon call for bids for the construction of an 84-ft. by 300-ft. frame car repair shed at Minot, N. D. This road has awarded a contract to the National Boiler Washing Company, Chicago, for the construction of a hot water washout and refill system at Wenatchee, Wash., and to the F. W. Miller Heating Company, Chicago, for a similar system at Minneapolis Junction, Minn.

NORTHERN PACIFIC.—This company has authorized the raising of tracks in Seattle, Wash., incident to improving Ninth avenue south, to cost about $60,000; the replacing of a timber bridge over Olegua Creek near Winslock, Wash., with deck girder spans to cost approximately $50,000; the replacing of a timber trestle over Wilson Creek, near Indio, Wash., with two 100-ft. plate girder spans to cost approximately $41,000; the replacing of a turntable at Livingston, Mont., to cost approximately $41,000; the construction of an 80-ft. extension to the inbound freight house office at Seattle, Wash., including a new heating plant to cost approximately $22,000; the replacing of the dry kiln at Brainerd, Wash., with a modern kiln of larger capacity, to cost approximately $37,000; the construction of a car repair shed at Auburn, Wash., to cost approximately $20,000; and the placing of riprapping on the Seattle and Tacoma divisions to the amount of approximately $200,000.

NORTHERN PACIFIC.—This company, which was reported in the *Railway Age* of May 6 as having closed bids for repairs and improvements to dock No. 6, Duluth, Minnesota, has awarded contracts for the work to Barnett & Record and W. N. Hill, Duluth, and to Grant Smith & Company, St. Paul, Minnesota. The company has also awarded a contract to Winston Brothers & Grant, Minneapolis, for the construction of a $250,000 passenger station and office building at Glendive, Montana.

OKLAHOMA-SOUTHWESTERN.—This company has awarded a contract to the Allhands & Davis Construction Company, Joplin, Mo., for the construction of a 10-mile extension from Nuyaka to Okmulgee, Okla., and contemplates further extensions in the near future. It is expected that the grading for the Nuyaka-Okmulgee extension will begin within the next 30 days.

TEXAS & PANHANDLE.—This company, representing local business interests, has had under consideration for several years and is now about to petition the Interstate Commerce Commission for authority to construct a 300-mile line from Seymour, Tex., in the Wichita Valley, northeasterly to Tucumcari, N. M., on the Chicago, Rock Island & Pacific. The proposed line will cross the Kansas City, Mexico & Orient at about Crowell, also the St. Louis-San Francisco and the Atchison, Topeka & Santa Fe, with the possibility of passing through Farwell, on the latter road. The main shop will probably be located at Turkey, Tex. Preliminary surveys have been made by Wallace & Noonan, Chicago, and local committees are now being organized to enlist the support of land owners along the line. The section to be traversed by the line is now partially developed but considerably removed from transportation facilities.

New York Central to Build Castleton Bridge

The New York Central has authorized the immediate commencement of the Castleton bridge and cut-off calling for the ultimate expenditure of approximately $20,000,000, the expenditure in the next two years being about $12,000,000. The improvement work included in the above includes a high-level steel bridge across the Hudson river about 12 miles south of Albany, N. Y., a large freight classification yard in the vicinity of Feura Bush, N. Y., and about 20 miles of double-track connections linking up the railroad with the West Shore and the Boston & Albany by easy grades. This improvement will increase the freight and passenger carrying capacity of the road while it may make possible a reduction in time of transit of fast freight between the North Atlantic ports and the Middle West.

The order for the fabrication of the 23,000 tons of structural steel for the bridge was noted in a recent issue of the *Railway Age*. Invitations for bids on the erection, masonry, grading, dredging and other work have been sent out and everything is being done to facilitate the quick completion of the bridge, the yard and the more important parts of the rail connections. All grade crossings in connection with the project will be eliminated. The bridge will be double track with provision for two additional tracks at some future date. It will have one 600-ft. and one 400-ft. main truss spans over the channel flanked by steel viaduct approaches, the total length being about one mile. It is expected that this work will be completed and in operation by early in 1924.

Railway Financial News

ATLANTIC COAST LINE.—*Annual Report.*—The annual report issued this week shows the following corporate income account for 1921:

	1921	1920
Gross	$66,730,768	*$25,304,074
Operating expenses, taxes, etc.	61,150,483	*22,417,740
Operating income	$5,580,285	*$2,886,334
Standard return (2 months)	.....	1,684,187
Government guaranty (6 months)	.....	5,478,458
Other income	4,423,110	5,203,804
Total income	$10,003,395	$15,252,783
Interest, rentals, etc.	8,212,826	7,568,627
Net income	$1,790,569	$7,684,156
Preferred dividends	9,835	9,835
Common dividends	4,801,034	4,801,034
Deficit	$3,020,300	†$2,873,287

*For four months. †Surplus.

BOSTON & MAINE.—*Injunction Halts Annual Meeting.*—The annual meeting at Boston on May 16 was suddenly adjourned to May 31 when it became known that injunction proceedings had been brought in the Supreme Court to prevent the New Haven's holdings from being voted. Edmund D. Codman filed the petition, the effect of which would be to restrain the counting of ballots for the election of directors, five of whom, according to a federal court degree given on May 12 by Judge Mayer in New York, were to be representatives of the New York, New Haven & Hartford.

CANADIAN PACIFIC.—*Address of President Beatty.*—At the annual meeting in Montreal on May 3, President E. W. Beatty said, in part:

The forty-first annual report indicates in a vivid way the effect on your company's operations of the acute depression through which the business of the country passed during 1921, and it is a matter of gratification that, notwithstanding the decrease in gross earnings of $23,619,000, the economies which were effected resulted in somewhat increased net earnings, and, of course, a slightly larger surplus, after paying fixed charges and usual dividends on the preferred and common stocks. The results reflect great credit upon the ability of the officers and men of the company, and are also a tribute to the physical condition of the property.

Sales of agricultural lands were, as indicated in the report, small, due to the general depression and the absence of the immigration of agriculturalists during the year. In my opinion, Canada cannot afford to be without a definite and forward immigration policy much longer. While it is urged that the depression both in agriculture and in general industry, with consequent unemployment during the past winter, is a reason why active immigration measures should not be taken, it must not be forgotten that there are types of immigrants that can be readily obtained and brought to Canada without the possibility of adding to the burdens of the country.

As forecast in the address at the last annual meeting, reductions took place during the year in both rates of wages and in freight and passenger rates. The former, which became effective July 16, last, was equivalent to a reduction of 9.03 per cent on then existing payrolls of the company. The demand for further freight rate reductions is still persistent throughout Canada, and to the existing scale of rates is attributed much of the present slackness in business. It is, in my opinion, an entirely erroneous impression that the existing freight rates are the cause, rather than the result, of the present economic conditions, the most important of which, from a transportation standpoint, is the present scale of wages and working conditions which the railways were compelled by government authority to accept during the war.

It is the view of your directors, and it has been their view for some time, that the scaling downward of freight rates should be begun with reductions on basic commodities, especially in those industries which have felt the general depression most severely. Nothwithstanding the willingness of the companies to make sacrifices in their revenues in the hope that a lower scale of rates on basic commodities would give an impetus to business activity, they have been precluded from agreeing on a definite policy because of the approaching expiration, on July 7, next, of the provisions of the railway act allowing the railway commission to make rates irrespective of agreements, statutory or other.

I had been hopeful that the present year would see a resumption of at least normal activity in maintenance and construction works, the necessity for which always prevails on a system the size of the Canadian Pacific. Apparently, however, we have not reached the period at which we can say that large expenditures are warranted, especially in view of the freight rate situation.

Gross earnings on all Canadian roads still show substantial decreases under those of the corresponding period of 1921. Crop conditions, however, so far as they can be judged at this date, are very favorable, and there is a returning spirit of optimism and activity which should grow in volume if the agricultural prospects are realized.

The company's taxation is not unnaturally increasing from year to year, approximately $10,000,000 having accrued in federal taxes during the last five and one-half years. As indicated in the annual report, the finances of the company are in splendid condition, and the credit of the company has been well maintained and is extremely high. While there are some serious and difficult problems yet to be solved, the general sentiment of the country shows a distinct improvement over that prevailing at the end of last year and the beginning of 1921.

CENTRAL OF GEORGIA.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $1,313,000 of refunding and general mortgage 6 per cent bonds to be pledged from time to time as security for short term notes.

CHICAGO, MILWAUKEE & ST. PAUL.—*Six Months' Guaranty Certified.*—The Interstate Commerce Commission on May 11 announced its first final settlement of the amount of the six months' guaranty for 1920 in the case of one of the larger railroad systems when it certified the amount for the Chicago, Milwaukee & St. Paul as $23,111,528, of which all but $673,636 had been paid in the form of advances and partial payments.

CLEVELAND UNION TERMINALS COMPANY.—*Hearing on Application to Issue Securities.*—The Interstate Commerce Commission has assigned this company's application for authority to issue stock and bonds for a hearing before Examiner Agate at Cleveland on May 23.

GEORGIA, ASHBURN, SYLVESTER & CAMILLA.—The Interstate Commerce Commission has issued a certificate authorizing the acquisition and operation by this company of the railroad extending from Ashburn to Camilla, Ga., a distance of 51 miles, formerly operated as a part of the Hawkinsville & Florida Southern. The applicant company has been organized to purchase this section, the receiver having fixed $125,000 as an upset price for that portion of the property.

GRAND TRUNK RAILWAY OF CANADA.—*Annual Report.*—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenues:		
Freight	$54,239,904	$58,102,054
Passenger	15,510,164	16,948,180
Total, including other	76,858,032	81,442,647
Operating expenses:		
Maintenance of way and structures	12,862,797	12,005,384
Maintenance of equipment	17,809,497	21,103,422
Traffic	1,583,830	1,304,107
Transportation—rail line	35,574,798	38,518,233
General	2,904,024	2,787,700
Total operating expenses	71,179,293	76,213,815
Net revenue from railway operations	5,678,739	5,228,832
Railway tax accruals	1,325,577	1,280,063
Railway operating income	4,344,254	3,925,765
Total non-operating income	8,634,102	7,706,273
Gross income	12,978,355	11,632,038
Interest on funded debt	16,492,615	10,054,583
Total deduction from gross income	27,042,797	16,231,142
Income balance	Def. 14,064,442	Def. 4,599,105

INTERNATIONAL & GREAT NORTHERN.—*Valuation.*—Following a valuation of the property of the International & Great Northern by the Texas State Railroad Commission that body has officially announced the amount to be $38,748,469 and holds in abeyance claim for an additional $376,646 represented in a 6 per cent value of franchise. The commission will issue a supplemental order if it recognizes the franchise valuation. Against the valuation allowed, the International & Great Northern has outstanding indebtedness as of December 31, 1920, of $33,267,000, making a difference in favor of the railroad company of a little more than $5,000,000. This difference, it is understood, represents additional receiver's certificates and equipment obligations issued since December 31, 1920, as well as to give the company a working fund to meet current expenses immediately following the proposed reorganization to terminate the receivership.

LAKE ERIE & WESTERN.—*New Directors.*—The following new directors have been elected: O. P. Van Sweringen, M. J. Van Sweringen, J. J. Bernet, Otto Miller, W. A. Colston, J. R. Nutt, John Sherwin, H. Van Vechten and C. L. Bradley.

LEHIGH VALLEY.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Lehigh Valley Car Repairs Big Factor in 1921." See also excerpts from annual report on adjacent pages; also editorial entitled "Annual Reports and Publicity."

LONG ISLAND.—*Asks Authority for Equipment Trust Obligations.*—This company has applied to the Interstate Commerce Commission for authority to issue $980,000 of ten-year, 6 per

cent equipment trust obligations to be taken by the American Car & Foundry Company in payment for 40 passenger motor cars costing $1,078,440 and 10 steel passenger cars the cost of which totals $147,735.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Annual Report.*—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920*
Total operating revenue	$26,185,804	$34,270,691
Total operating expenses	24,325,915	30,847,709
Net operating revenue	1,859,888	3,399,260
Railway tax accruals	1,899,069	2,513,934
Operating income	Def. 43,214	826,246
Total non-operating income	1,616,018	†8,923,523
Gross income	1,572,804	9,749,769
Interest on mortgage bonds	3,188,945	2,913,850
Total deductions from gross income	5,044,962	6,665,156
Net income	Def. 3,472,158	3,084,613

*Operating revenues and expenses, March 1 to Dec. 31.
†Includes income from lease of road.

Chairman Elected.—Edmund Pennington, former president, has been elected chairman of the company, a newly-created position.

MISSOURI, KANSAS & TEXAS.—*Branch Line Sold.*—William Edenborn, of New Orleans, president and principal owner of the Louisiana Railway & Navigation Company, has concluded arrangements to purchase that part of the Missouri, Kansas & Texas system extending from McKinney, Texas, to Shreveport, La., about 220 miles. The purchase price has not been announced, but it is said to be close to $30,000,000.

NEW YORK, CHICAGO & ST. LOUIS.—*Annual Report.*—See excerpts from annual report on an adjacent page.

NORFOLK & WESTERN.—*Asks Authority to Guarantee Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority to guarantee $6,700,000 of ten-year 5 per cent equipment trust certificates, instead of 5½ per cent certificates as was incorrectly stated in these columns last week. The certificates are to be issued by the Virginia Holding Company for equipment to be leased to the Norfolk & Western and are to be sold at not less than 97.75.

PERE MARQUETTE.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Pere Marquette Surplus After Charges, $3,765,880." See also excerpts from annual report on adjacent pages.

Abandonment of Lines Recommended.—The Interstate Commerce Commission has made public tentative reports by an examiner recommending that certificates be issued authorizing the abandonment of the Freeport branch, 6.23 miles, and the line from a point near White Cloud to Big Rapids, Mich., 19.67 miles.

TOLEDO, PEORIA & WESTERN.—*Annual Report.*—The corporate income account for the year ended December 31, 1921, is as follows:

	1921	1920*
Operating revenues:		
Freight	$996,984	$1,285,608
Passenger	568,635	630,174
Total, including other	1,692,420	2,090,667
Operating expenses:		
Maintenance of way and structures	366,595	382,554
Maintenance of equipment	530,007	676,494
Traffic	37,233	36,154
Transportation	874,686	1,249,355
General	95,193	97,024
Total	1,903,532	2,441,420
Net revenue from railway operations	Def. 211,112	Def. 350,753
Railway tax accruals	117,542	122,000
Railway operating income	Def. 328,654	Def. 472,753
Total non-operating income	106,004	634,962
Gross income	Def. 222,650	162,209
Total deduction from gross income	285,005	350,249
Net income	Def. 507,654	Def. 188,040

*Corporate and federal operations combined.

UNION PACIFIC.—*Annual Report.*—The income for the calendar year 1921, compared with the calendar year 1920, after excluding all offsetting accounts between the Union Pacific Railroad Company, the Oregon Short Line Railroad Company and the Oregon-Washington Railroad & Navigation Company, was as follows:

	1921	1920	Increase or decrease
Operating revenues	$181,445,913	*$175,260,837	.....
Rental from United States Railroad Administration (two months)	.....	7,099,453	.....
Total receipts	181,445,913	182,360,290	.....
Operating expenses	131,601,749	*135,303,242	.....
Receipts over expenses	49,844,164	47,057,048	$2,787,117
Taxes	11,720,856	*10,754,015	966,840
Operating income	38,123,309	36,303,032	1,820,276
Other income, representing rents received and incidental operations	1,795,054	*1,492,885	302,169
Total income from railroad properties	39,918,362	37,795,917	2,122,446
Deductions, representing rents paid, hire of equipment and incidental operations	5,692,195	*1,833,655	3,858,540
Net income from railroad properties	34,226,167	35,962,262	—1,736,094
Income from investments and miscellaneous income	13,138,088	12,298,957	839,131
Total income from all sources	47,364,255	48,261,218	896,963
Deduct: Interest on funded debt and miscellaneous charges	16,063,180	15,586,987	476,193
Net income from all sources	31,301,075	32,674,231	—1,373,156
Dividends on stock of Union Pacific Railroad Company:			
Preferred stock at 4 per cent	3,981,740	3,981,740	.....
Common stock at 10 per cent	22,229,160	22,229,160	.....
Sinking fund requirements	10,173	10,877	—703
Total appropriations of net income	26,221,073	26,221,777	—703
Surplus, transferred to profit and loss	5,080,002	6,452,454	—1,372,453

*For ten months, March to December, 1920, with a few minor exceptions, the Railroad Administration having operated the properties during the two months, January and February, 1920.

WESTERN PACIFIC.—*Annual Report.*—The corporate income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenue:		
Freight	$8,974,264	$10,499,725
Passenger	2,324,507	2,365,166
Total, including other	12,104,155	13,595,790
Operating expenses:		
Maintenance of way and structures	2,157,574	2,232,282
Maintenance of equipment	2,338,689	2,073,740
Traffic	378,728	308,852
Transportation	4,561,023	4,974,362
General	716,855	446,281
Total operating expenses	10,391,343	10,311,410
Net revenue from railway operations	1,712,812	3,284,380
Railway tax accruals	*1,230,981	670,079
Total operating income	481,024	2,613,487
Non-operating income	4,445,463	2,050,685
Gross income	4,926,487	4,664,171
Interest on funded debt	1,225,860	1,202,755
Total deductions from gross income	2,067,953	2,247,960
Net income	2,858,533	2,416,212
Income applied to sinking fund	50,000	50,000
Income balance	2,808,533	2,366,212

*Includes $205,173 income taxes for years 1918 and 1919 paid in 1921 on account of compensation received as rental of property for 1918-1919 in excess of compensation on which taxes had been paid for the year in question.

More Equipment Trusts Sold

The director general has announced additional sales of railroad equipment trust certificates maturing January 15, 1923, to January 15, 1935, inclusive, now held by the government, to:

Hornblower & Weeks, New York City:	
Chicago & Alton	$1,049,100
Cassatt & Co., Philadelphia, Pa.:	
Chicago Great Western	375,700
	$1,424,800

The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is $253,375,500.

Dividends Declared

Alabama Great Southern.—Common, 3½ per cent, semi-annually, payable June 29 to holders of record May 31; preferred, 3½ per cent, semi-annually, payable August 17 to holders of record July 13.

Chicago & North Western.—Common, 2½ per cent, semi-annually; preferred, 3½ per cent, semi-annually; both payable July 15 to holders of record June 15.

Erie & Pittsburgh.—1¾ per cent, quarterly payable June 10 to holders of record May 31.

North Pennsylvania.—$1, quarterly, payable May 25 to holders of record May 11.

Pittsburgh, Bessemer & Lake Erie.—Preferred, 3 per cent, semi-annually, payable June 1 to holders of record May 15.

Pittsburgh, Youngstown & Ashtabula.—Preferred, 1¾ per cent, quarterly, payable June 1 to holders of record May 20.

Southern Pacific.—1½ per cent, quarterly, payable July 1 to holders of record May 31.

Union Pacific.—Common, 2½ per cent, quarterly, payable July 1 to holders of record June 1.

Trend of Railway Stock and Bonds Prices

	May 16	Last Week	Last Year
Average price of 20 representative railway stocks	64.31	64.95	56.38
Average price of 20 representative railway bonds	85.87	86.07	74.05

Annual Reports

Lehigh Valley Railroad Company—Sixty-Eighth Report

PHILADELPHIA, Pa., April 3, 1922.

To the Stockholders of the Lehigh Valley Railroad Company:

The Board of Directors submits herewith a report of the business and condition of your company for the calendar year ended December 31, 1921.

INCOME

The Corporate Income Account for the year was as follows:

Total Operating Revenue		$74,997,799.15
Total Operating Expenses		67,238,067.77
Net Operating Revenue		$7,759,731.38
Railway Tax Accruals	$2,026,088.03	
Uncollectible Railway Revenues	40,683.80	
		2,066,771.83
Operating Income		$5,692,959.55
Other Income		12,839,774.08
Total Income		$18,532,733.63
Deductions from Income		8,481,936.12
Net Income		$10,050,797.51

PROFIT AND LOSS

Balance December 31, 1920	$36,326,576.04
Transferred from Income	10,050,797.51
Miscellaneous Items—Net	1,399,705.37
	$47,777,078.92
Dividends	4,245,749.00
Balance December 31, 1921	$43,531,329.92

The Income Statement is not comparable with that for the previous year, because of the fact that the corporation operated its property during only 10 months of 1920. A consolidated income account showing revenues and expenses in detail for both years, on a comparable basis, including both Federal and Corporate operations, will be found on page 15 of the report.

Operating Revenues for the year were practically the same as for the previous year, there being a decrease of slightly less than $300,000. Operating expenses, however, decreased 16%, or $12,785,082.62.

FINANCIAL

The following obligations matured and were paid and cancelled during the year:

Collateral Trust 4% Bonds	$1,000,000.00
Equipment Trust Series "M" Certificates	200,000.00
Equipment Trust Series "O" Certificates	500,000.00
Equipment Trust Series "R" Certificates	400,000.00
	$2,100,000.00

In addition to the above, the following unmatured Equipment Trust Certificates, all of which were owned by your company, were paid and cancelled during the year and the Equipment Trusts terminated:

Equipment Trust Series "M" Certificates	$400,000.00
Equipment Trust Series "O" Certificates	500,000.00
Equipment Trust Series "R" Certificates	400,000.00
	$1,300,000.00

This leaves your company without any Equipment Trust Obligations.

At the close of the year the company held in its treasury the following securities of its own issue, amounting to $13,742,000.00, which are not included in the unpledged securities, amounting to $30,131,172.48, shown on page 10.

Consolidated Mortgage 4½% Bonds	$66,000.00
Consolidated Mortgage 6% Bonds	108,000.00
Collateral Trust 4% Bonds	1,088,000.00
General Consolidated Mortgage Bonds	12,480,000.00
	$13,742,000.00

In addition, $3,806,000.00 General Consolidated Mortgage Bonds are temporarily held by the United States Government, as collateral, pending settlement of Federal Control and Guaranty Period accounts. It is expected that during the year 1922 a substantial sum will be received from the Government in final settlement of these matters and the collateral released.

Since 1903, the date of the General Consolidated Mortgage, expenditures have been made for additions and betterments to your company's properties and for other capital purposes of approximately $26,650,000.00 against which no securities have been issued.

An issue of $6,000,000.00 Easton & Amboy Railroad First Mortgage 5% Bonds, the principal and interest of which are guaranteed by your company, will mature during 1922. This will require no new financing, as provision has been made for the payment of these bonds out of available funds. This payment will entitle the Lehigh Valley Railroad Company to receive $6,000,000.00 additional bonds under the General Consolidated Mortgage of September 30, 1903, which bonds the company in due course will secure from the trustee and place in its treasury for future use.

ROAD AND EQUIPMENT

Expenditures for additions and betterments to road and equipment, including expenditures for subsidiary properties, during the year amounted to $6,413,036.40, against which there were credits representing the sales or retirement of property of $3,156,480.67, leaving a net expenditure of $3,256,555.73.

The most important items, the cost of which was charged wholly or in part to Investment in Road and Equipment, are as follows:

Work was continued on Claremont Terminal, the water and rail terminal your company is building on New York Bay, Jersey City. The first unit of this development, which will be ready for service during the year 1922, is a pier more than two-thirds of a mile long, with 35 feet of water alongside, at which the largest ships afloat can be berthed. Its facilities will include a two-story warehouse with a capacity of 500 cars of freight, an open dock served by a 30-ton traveling gantry crane capable of handling 100 cars of freight a day, and two electrically operated unloaders to handle ore and coal from vessels to cars, with a capacity of 20,000 tons per 24 hours. As increased traffic warrants, two additional piers will be built. When completed in its entirety, the terminal will afford docking facilities of approximately five and one-half miles, capable of berthing the largest ocean-going craft.

The new freight pier station, erected by your company at the foot of East 47th and East 48th streets, New York City, was completed and placed in service.

New passenger and freight stations were erected at Ulster and Middlesex.

At Hillside, formerly known as West Elizabeth, the freight house was relocated and a new platform for handling milk constructed.

To facilitate the movement of freight trains, three passing sidings on the Seneca Division at Laceyville, Rummerfield and Tunkhannock, were extended a total of approximately two and one-half miles.

To expedite the handling of automobiles at Wilkes-Barre and 149th Street Terminal, New York City, existing facilities were enlarged and improved.

Twenty-one new motor cars for use in maintenance of way work, etc., were placed in service.

Thirty automatic signals between South Somerville and Stanton were equipped with electric lights, replacing acetylene gas light equipment.

Interlocking plants at Easton, Packerton and Laurel Junction were rewired and upper quadrant signals installed. Few new audible-visible crossing alarms were installed.

Two new tugs, nine lighters and three covered barges for use in New York harbor were added to your company's floating equipment.

GENERAL REMARKS

Your company is offering for industrial development a 230-acre tract at Buffalo, following the clearing of certain long-disputed titles. The property has a frontage on Lake Erie of over a mile, amply protected by breakwater, and lies less than two miles from the center of Buffalo, adjoining the 500-acre freight terminal of your company, with which it has direct track connection. It offers special advantages as sites for grain elevators, or industries desiring lake and rail transportation facilities.

Stockholders now number 19,122, with an average holding of 63 shares. Of this number, 7,028 are women and 615 banks, insurance companies, fiduciaries and charitable organizations. One thousand three hundred and seventy-three of the company's employees have invested their savings in the stock.

In connection with the order of the United States Supreme Court, directing your company to sever its connection with The Lehigh Valley Coal Company and Coxe Brothers & Co., Inc., careful study was devoted to formulating a plan to carry out the Courts' order. In seeking a solution of this problem, the management has kept constantly in mind the necessity of complying fully with the letter and spirit of the Court's decision, and at the same time protecting the interests of its many stockholders and owners of its General Consolidated Mortgage Bonds. To accomplish the desired result, the management has presented a plan to the District Court for the Southern District of New York. The Government has entered certain objections to the plan and it is now awaiting argument.

The bad order freight car situation, which has been mentioned in previous reports, continued serious. Many of your company's cars, which had been away from its rails since Federal control, were returned during the year in a crippled condition, lack of proper maintenance during Government operation being largely responsible. To be prepared to meet a business revival prompt repair of these cars was necessary. Because of the high rates of pay and expensive restrictions governing working conditions for railroad employees, prescribed by the United States Railroad Labor Board, but which do not apply in other industries, favorable contracts were made with several outside concerns for part of this work. A total of 9,975 cars were delivered to various car builders for general repairs during the year, on which your company saved $690,274.50, as compared with the cost of making these repairs at its own shops, which, in the past, under normal conditions, have been able to take care of this work.

As an illustration of the deplorable condition of equipment at the termination of Federal control, your company expended and charged to operating expenses for the maintenance of engines, cars and floating equipment during 1921 a total of $25,138,717.00, an increase of practically $1,500,000.00 over the previous year and approximately $8,037,400.00 more than would have been disbursed had expenditures been limited for this purpose to the same ratio as applied on other railroads during the year, according to Interstate Commerce Commission records.

Worldwide business depression resulted in a decrease in revenue producing tonnage of the railroads in the United States in 1921 of 25.18% as compared with 1920. On the Lehigh Valley the decrease was 19.26%. In meeting the business depression the management sought to make every possible economy in operation. As a result, on December 31, 1921, it showed an 18% reduction in employees as compared with December 31, 1920. On the other hand, there was a notable gain in efficiency over the previous twelve months.

As a result of the policy of recent years of putting only creosoted ties into the roadbed, it was necessary to place but 456,789 ties in tracks during 1921, as compared with an average of 838,627 for the five-year period prior to Federal control. It is anticipated that the annual requirements will continue to show a reduction as the number of creosoted ties in the track increases. There are in track at this time 5,707,979 creosoted ties, which is approximately 62% of the total number of ties in service. The policy of purchasing only rail weighing 136 pounds to the yard also was continued. There are now 380 miles of track laid with this heavy rail.

Freight claims paid during the year amounted to $1,262,290.60, a decrease of $1,092,256.78 as compared with the year 1920.

Taxes accrued during the year amounted to $2,196,959.42, which is an increase of 36% over the average annual tax accruals for the five-year period prior to Federal control. The tax situation has become a serious one for all railroads, due largely to the issue by different communities of bonds for highway improvements, resulting in enormous increases in taxes to meet the interest and sinking fund payments on such bonds. In effect, this means that the railroads are contributing large sums for the benefit of their motor-truck competitors whose inroads upon railroad traffic are continuously increasing.

While 1921 was hardly to be regarded as a year for business expansion, the Industrial Department located 73 new industries in the territory served by your railroad. Of this number 43 have direct sidetrack connections.

Mr. Arthur W. Sewall, a director of your Company, resigned during the year, and General Harry C. Trexler was elected to the Board.

Officers and employees exhibited a gratifying spirit of co-operation in the performance of their duties, for which the management is deeply grateful.

Respectfully,

E. E. LOOMIS, President.

GENERAL BALANCE SHEET DECEMBER 31, 1921

Assets

Investments:		
In road .....(See note below)	$32,562,134.07	
In equipment	68,155,463.60	
		$100.717,597.67
Improvements on leased railway property.....		1,613.682.44
Miscellaneous physical property.....		2,124,912.06
Investments in affiliated companies:		
Stocks	$54,032,052.67	
Bonds	22,715,654.52	
Notes	3,831,179.97	
Advances	14,147,444.16	
		94,726,331.32
Other Investments:		
Stocks	$855,367.00	
Bonds	5,770,151.44	
Notes	3,016,380.29	
Miscellaneous	9,647.00	
		9,651,545.73
Total investments.....		208,834,069.22
Current Assets:		
Cash	$6,675,601.64	
Special deposits	84,198.28	
Loans and bills receivable.....	2,039.69	
Traffic and car-service balances receivable	1,141,803.35	
Net balance receivable from agents and conductors	1,418,700.03	
Miscellaneous accounts receivable.....	1,865,947.57	
Material and supplies.....	6,313,095.67	
Interest and dividends receivable.....	3,432,564.97	
Rents receivable	70,622.12	
Other current assets.....	476,197.60	
Total current assets.....		21,480,770.92
Deferred Assets:		
Working fund advances.....	$12,939.00	
Insurance and other funds.....	22,892.72	
Other deferred assets.....	3,381,361.39	
Total deferred assets.....		3,417,193.11
Unadjusted Debits:		
Rents and insurance premiums paid in advance	$37,701.22	
Other unadjusted debits.....	454,020.38	
Total unadjusted debits.....		491,721.60
Total Assets		$234,223,754.85

Liabilities

Stock:		
Common stock.....	$60,501,700.00	
Preferred stock	106,300.00	
Total stock outstanding.....		$60,608,000.00
Long-Term Debt:		
Funded debt	$131,436,000.00	
Less—Funded debt held in treasury.....	37,548,000.00	
Total long-term outstanding.....		93,888,000.00
Current Liabilities:		
Traffic and car-service balances payable..	$33,436.55	
Audited accounts and wages payable....	7,712,862.48	
Miscellaneous accounts payable.....	437,254.19	
Interest matured unpaid.....	413,860.50	
Dividends matured unpaid.....	14,655.21	
Funded debt matured unpaid.....	2,000.00	
Unmatured dividends declared.....	1,061,410.31	
Unmatured interest accrued.....	816,035.01	
Unmatured rents accrued.....	346,455.89	
Other current liabilties.....	842,889.86	
Total current liabilities.....		11,680,860.00
Deferred Liabilities:		
Liability for provident funds.....	$58,417.53	
Other deferred liabilities.....	1,598,731.98	
Total deferred liabilities.....		1,657,149.51
Unadjusted Credits:		
Tax liability	$1,122,745.14	
Insurance and casualty reserves.....	201,313.21	
Operating reserves.....	1,447,241.94	
Accrued depreciation—Equipment.....	19,402,032.61	
Other unadjusted credits.....	656,790.87	
Total unadjusted credits.....		22,830,123.77
Corporate Surplus:		
Additions to property through income and surplus	$28,291.65	
Profit	43,531,329.92	
Total corporate surplus.....		43,559,621.57
Total liabilties		$234,223,754.85

NOTE—The item, Investment in Road, represents only road property of Lehigh Valley Railroad Company proper (Phillipsburg, N. J., to Wilkes Barre, Pa.). The total road and equipment Investments of the system, including transportation subsidiaries, owned by your Company, is $222,000,-764.57.

GENERAL REMARKS TO OWNERS OF RAILROAD SECURITIES

The general situation affecting the transportation interests of the United States is worthy of the attention and careful study of all owners of railroad securities. The year just closed was one of upset and disturbed conditions, and 1922, while promising better things, offers serious and difficult problems, particularly from a railroad point of view.

During 1921 the situation was complicated, so far as the railroad companies were concerned, by diffculties with organized labor, the leaders of which were ill-disposed to accept the deflation of wages brought about in almost every other industry, and by demands for reduced freight rates from commercial interests, sorely pressed by prevailing conditions.

After an exhaustive investigation, the United States Railroad Labor Board in July announced a reduction in wages of approximately 11½% for all classes of employes, and later during the year it promulgated new rules governing their working conditions—the latter taking the place of the National Agreements made with various unions during Federal control. While the National Agreements have been abrogated, National rules laid down by the Labor Board have been substituted. These are not as onerous as the National Agreements, but prove a handicap to economical and efficient operation because they are standardized for the country as a whole and make no allowance for local conditions. Neither the wage reduction nor the new rules made it possible for the railroads to reduce their operating expenses sufficiently to consider any horizontal reduction in rates. The railroads agreed, however, to seek further reductions in wages, with a view to harmonizing them with the prevailing rates of pay in other industries, with the understanding that all savings effected should be passed along to the public in the form of reduced rates, and the matter is now before the Labor Board.

In the meanwhile, numerous voluntary adjustments in freight rates were made by the railroads, correcting obvious cases of injustice, and, late in the year, all the railroads of the country agreed, beginning January 1, 1922, to make a reduction of 10% in rates on farm products, while on December 27, 1921, a 16⅔% reduction in the rates on grain and grain products, ordered by the Interstate Commerce Commission, became effective in western territory.

RATE REDUCTIONS SOUGHT AS AID TO OTHER INDUSTRIES

Despite these reductions, the demand for further concessions in rates continued unabated. Belief that such action offered a panacea for prevailing business difficulties apparently was widespread. The railroads as a whole spent far less on their properties during the last year than normally required. Their return to the market as purchasers to any important degree is possible only by permitting them to earn a fair return on their investment, but there was little disposition to give this opportunity to the country's largest buyer. Instead, it was argued that rate reductions must be made that this or that industry might be rescued from the unsatisfactory conditions into which it had lapsed as a result of the worldwide depression. Because of this insistent demand for further reductions, the Interstate Commerce Commission, on its own motion, decided upon a general inquiry into the whole question of transportation charges.

The Committee on Interstate Commerce of the United States Senate is now conducting an exhaustive inquiry into all phases of the transportation problem. While no important changes have been made in the Transportation Act of 1920, special attack has been made upon the provision of the law requiring the Interstate Commerce Commission to make rates which will provide the railroad companies with a fair return upon their properties used in railroad operation, and upon the section under which the Interstate Commerce Commission is given authority over intrastate rates where they affect intrastate rates.

It will be recalled that the Transportation Act specifically required the Interstate Commerce Commission to make rates which would bring to the carriers revenues representing a reasonable return upon their investment in property used for railroad purposes and provided particularly that for the period between the passage of the Act and February 28, 1922, this reasonable rate should be 6 per cent. In 1921 the carriers, as a whole, earned only 3.3% on their investment, despite this provision, so frequently incorrectly called a guarantee.

RAILROAD'S CREDIT SITUATION IS AID TO MALCONTENTS

Advocates of some form of Government ownership of railroads, a question which it was thought had been eliminated as an issue in the railroad situation following experiences during the war and immediately afterward, continued to urge their ideas. The most active were officials of various labor organizations, pressing the so-called Plumb Plan, which provides for Government ownership with operation by the unions, and the theorists who see in the socialization of all public utilities the solution of all the ills to which the world is subject. Another element, and one which invites careful consideration, bids fair to become more important in the future. In recent years there has been a serious decline in railroad development. Not only have lines not been extended, but terminal facilities, additional trackage, etc., have not been constructed to keep pace with the Nation's commercial growth, and many railroad companies have not been in a financial position which would enable them to purchase new engines and cars in numbers calculated to meet the situation. When business revives, the demand for transportation probably will be greater than the capacity of existing facilities, and the railroads as a whole will have difficulty in supplying the service required. Past experience indicates that the unthinking immediately will start a clamor for Government ownership.

This should be a matter of concern to all, and particularly to those whose business is dependent upon adequate and efficient transportation. Experiences with Government owned railroads in other countries, without exception, has demonstrated the impossibility of their performing service of a character approaching our standards and such railroad systems, instead, are the mere cat's-paw of politics with the burden of making up deficits in the cost of operation falling upon the people in the form of taxation.

To meet this threatened condition requires an attitude on the part of the Government and the people which will permit American railroads to re-establish their credit, that they may be able to finance needed improvements to their properties.

It is necessary that those who would be fair in regard to such matters, and particularly those who have even more interest because of their investments, should not only themselves recognize the situation which has been forced upon the railroads, but also that they should make it a point to bring all others to a realization of the fact that the condition is not one of the railroad's making, but the outgrowth of a policy of regulation which mistakenly has been carried too far. Likewise it is incumbent upon them to let their representatives in State and National legislative and regulatory bodies know where the owners of railroad securities stand regarding this problem, that there may be an end to the hampering and well-nigh strangulation of the carriers which has prevailed for the last two decades.

E. E. LOOMIS, President.

[ADVERTISEMENT]

New York, Chicago & St. Louis Railroad Company — Thirty-fifth Annual Report

To the Stockholders of

THE NEW YORK, CHICAGO AND ST. LOUIS RAILROAD COMPANY:

The Board of Directors herewith submit its report for the year ended December 31, 1921:

The capital stock authorized and issued to December 31, 1921, was		$30,000,000.00
being the same as at the close of the previous year		
The funded debt outstanding as of December 31, 1920, was		$37,320,000.00
It was decreased during the calendar year:		
By the retirement of Equipment Trust Certificates of 1916	$110,000.00	
By the retirement of Engine Trust Certificates of 1916	30,000.00	
By the retirement of Equipment Trust Certificates of 1917	135,000.00	
By the retirement of First Mortgage Bonds	115,000.00	
		390,000.00
Funded debt outstanding as of December 31, 1921		$36,930,000.00

You were advised in my letter of September 8, 1921, that final settlement had been effected with the United States Railroad Administration for all claims and accounts arising out of the period of Federal control. In accordance with the requirements of the Interstate Commerce Commission, the accounting for that settlement was accomplished during the year 1921. As a result of the settlement, the income of the company applicable to the years 1918, 1919, 1920 and 1921, has been finally determined and a statement of the income actually applicable to the years mentioned is set forth on page 11 of this report.

The usual financial and statistical statements are appended.

The Board takes pleasure in acknowledging the fidelity, efficiency, and united efforts displayed by your officers and employes in the discharge of their duties during the year.

For the Board of Directors,

J. J. BERNET, President.

INCOME ACCOUNT

Operating Income:		
Railway operating revenues		$27,030,663.44
Railway operating expenses		20,613,593.97
Net revenue from railway operations		$6,417,069.47
Railway tax accruals		$1,820,862.00
Uncollectible railway revenues		3,491.75
		$1,824,353.75
Railway operating income		$4,592,715.72
Nonoperating Income:		
Rent from locomotives		$5,264.69
Rent from passenger-train cars		18,516.13
Rent from work equipment		12,306.67
Joint facility rent income		76,042.87
Income from lease of road		3,412,397.74
Miscellaneous rent income		28,920.27
Miscellaneous non-operating physical property		19,231.71
Income from unfunded securities and accounts		137,869.13
Income from sinking and other reserve funds		425.00
Miscellaneous income		251,055.39
Total nonoperating income		$3,962,029.60
Gross income		$8,554,745.32
Deductions from Gross Income:		
Hire of freight cars—Debit balance		$27,918.99
Rent for locomotives		4,118.34
Rent for passenger-train cars		37,610.31
Rent for work equipment		3,566.26
Joint facility rents		203,534.79
Rent for leased roads		5,400.00
Miscellaneous rents		81,928.94
Miscellaneous tax accruals		2,858.60
Interest on funded debt		1,623,491.72
Interest on unfunded debt		6,171.44
Amortization of discount on funded debt		43,950.42
Miscellaneous income charges		2,191,490.99
Total deductions from gross income		$4,232,040.80
Net income		$4,322,704.52
Disposition of Net Income:		
Applied to retirement of first mortgage bonds		$98,190.40
Dividend appropriations of income		1,499,365.00
Total sinking fund and dividend appropriations		$1,597,555.40
Income balance transferred to profit and loss account		$2,725,149.12

PROFIT AND LOSS ACCOUNT

Credit balance December 31, 1920		$4,307,690.69
Add:		
Balance transferred from Income Account	$2,725,149.12	
Discount on first mortgage bonds purchased and retired	16,809.60	
Discount on equipment trust certificates of 1917 purchased and retired	11,365.00	
Unrefundable overcharges	16,236.74	
Profit on road and equipment sold	32,778.42	
Donations	2,900.45	
Miscellaneous credits	16,373.56	
		2,821,612.89
		$7,129,303.58
Deduct:		
Loss on retired road and equipment	$11,660.84	
Surplus appropriated for investment in physical property	2,900.45	
Dividend appropriations of surplus	1,774,360.00	
Miscellaneous debits	18,625.66	
		1,807,546.95
Credit balance December 31, 1921		$5,321,756.63

CONDENSED GENERAL BALANCE SHEET, DECEMBER 31, 1921

ASSETS

Investments			
Investment in road and equipment			
Road		$55,448,334.49	
Equipment		17,921,148.12	
General expenditures		81,133.39	
		$73,450,616.00	
Improvements on leased railway property		710,521.66	
Sinking fund for Equipment Trust Certificates of 1917		108.00	
Deposits in lieu of mortgaged property sold		4,554.47	
Miscellaneous physical property		932,998.68	
Investments in affiliated companies stocks		1,505,400.00	
Other Investments			
Miscellaneous		1,602.50	
			$76,605,801.31
Current Assets			
Cash		$1,154,098.97	
Time drafts and deposits		1,200,000.00	
Special deposits		1,883,105.00	
Loans and bills receivable		1,225.59	
Traffic and car service balances receivable		1,067,918.82	
Net balance receivable from agents and conductors		480,167.73	
Miscellaneous accounts receivable		688,656.23	
Material and supplies		2,356,370.11	
Interest and dividends receivable		14,602.00	
Other current assets		1,289.86	
			8,847,434.31
Deferred Assets			
Working fund advances		$7,319.11	
Insurance and other funds		10,287.50	
Other deferred assets		6,198.00	
			23,804.61
Unadjusted Debits			
Discount on funded debt		$412,442.28	
Other unadjusted debits		1,411,868.27	
Securities issued or assumed —Unpledged Capital stock of the New York, Chicago and St. Louis Railroad Co., held in treasury	$12,700.00		
Second and improvement mortgage bonds held in treasury	1,036,000.00		
		1,048,700.00	
			2,873,010.55
			$88,350,050.78

LIABILITIES

Stock—			
Capital Stock:			
First preferred		$5,000,000.00	
Second preferred		11,000,000.00	
Common		14,000,000.00	
			$30,000,000.00
Long Term Debt—			
Funded Debt Unmatured:			
Equipment obligations		$4,102,000.00	
First mortgage bonds		17,872,000.00	
Gold bonds of 1906		10,000,000.00	
Second and improvement mortgage bonds		4,956,000.00	
Second and improvement mortgage bonds nominally issued		1,036,000.00	
			37,966,000.00
Total capitalization			$67,966,000.00
Current Liabilities—			
Loans and bills payable		$60,000.00	
Traffic and car service balances payable		919,340.38	
Audited accounts and wages payable		1,313,271.00	
Miscellaneous accounts payable		94,484.87	
Interest matured unpaid		33,172.50	
Dividends matured unpaid		396,396.50	
Unmatured interest accrued		336,146.67	
Other current liabilities		138,598.99	
			3,291,410.91
Deferred Liabilities—			
Other deferred liabilities			82,075.69
Unadjusted Credits—			
Tax liability		$1,233,991.02	
Operating reserves		123,300.00	
Accrued depreciation—Equipment		3,360,173.34	
Other unadjusted credits		159,247.25	
			4,876,711.61
Corporate Surplus—			
Additions to property through income and surplus		$5,235,507.03	
Funded debt retired through income and surplus		1,576,588.91	
Total appropriated surplus		$6,812,095.94	
Profit and loss—Balance		5,321,756.63	
			12,133,852.57
			$88,350,050.78

[ADVERTISEMENT]

Report of the Pere Marquette Railway Company

DETROIT, Mich., April 1, 1922.

To the Stockholders:

The Board of Directors respectfully submit herewith their report of the affairs of the Pere Marquette Railway Company for the fiscal year ended December 31, 1921:

CORPORATE INCOME ACCOUNT

	Year Ended December 31, 1921	*Year Ended December 31, 1920	Increase and Decrease
Operating revenues	$38,303,029.43	$35,022,787.09	.....
Operating expenses	30,036,300.21	30,350,542.14	*.....
Net-operating revenue	$8,266,729.22	$4,672,244.95	.....
Non-operating income	690,653.53	1,761,120.49	*.....
Gross income	$8,957,382.75	$6,433,365.44	.....
Taxes	$1,408,480.66	$768,407.38	.....
Miscellaneous income charges	3,826.90	3,711.35	.....
Uncollectible railway revenues	4,695.86	1,397.92	*.....
Hire of equipment—Debit	550,381.72	1,297,173.65	.....
Rentals	839,771.28	730,410.11	.....
Total charges, excluding interest	$2,807,156.42	$2,801,100.41	.....
Balance before deduction of interest	$6,150,226.33	$3,632,265.03	$2,517,961.30
Interest on bonds	$1,687,754.22	$1,687,760.00	—$5.78
Interest on equipment notes	639,030.13	505,058.37	133,971.76
Interest on bills payable, etc.	57,562.02	45,473.96	12,088.06
Total interest accruals	$2,384,346.37	$2,238,292.33	$146,054.04
Surplus	$3,765,879.96	$1,393,972.70	$2,371,907.26
Ratio of operating expenses to operating revenues	78.42	86.66	.....
Ratio of taxes to operating revenues	3.67	2.19	*.....
Total	82.09	88.85	.....

*Note—The figures shown for the year 1920, represent results of ten months' operation by the Pere Marquette Railway Company, and two months' "Standard Return" received from the United States Railroad Administration covering Federal Control operations for January and February, 1920, which latter is included with "Non-Operating Income." As the operating revenues, expenses, etc., for the two months ended February 29, 1920, are not included in the above tabulation, the results from operation during the year 1921 are not comparable with the ten months period during which the road was operated by the Company in 1920.

FUNDED DEBT

During the year ended December 31, 1921, additional temporary Equipment Gold Notes aggregating $907,200.00 were issued in connection with the purchase of 40 locomotives and 3,000 freight cars allocated to the Pere Marquette Railway Company by the United States Railroad Administration, covered by Equipment Trust Agreement No. 63, dated January 15, 1920, between Walker D. Hines, Director General of Railroads, Pere Marquette Railway Company and the Guaranty Trust Company of New York, Trustee. These notes are numbered 17 to 30, inclusive, and amount to $64,800.00 each, being dated January 15, 1920, and mature serially January 15th of each year, beginning with 1922 and ending with 1935. They bear interest at the rate of 6% per annum, payable semi-annually on the 15th day of January and July in each year, and are subject to redemption at the election of the Railway Company at their face value and accrued interest, together with premium of 3% of the principal, in the manner and upon the terms and conditions provided for in said Equipment Trust Agreement.

The final agreed purchase price of all equipment covered by Equipment Trust Agreement No. 63, as certified by the Director General, was $10,121,167.28, which was satisfied by the Railway Company as follows:

Notes Nos. 1 to 15, inclusive, at $608,500.00 each, dated January 15, 1920, due annually, January 15, 1921, to January 15, 1935, inclusive, executed during the year ended December 31, 1920	$9,127,500.00
Notes Nos. 17 to 30, inclusive, at $64,800.00 each, dated January 15, 1920, due annually, January 15, 1922, to January 15, 1935, inclusive, executed during the year ended December 31, 1921	907,200.00
Cash payments made by the Railway Company to the Guaranty Trust Company of New York, Trustee, and to the Director General	*86,467.28
Total, representing final agreed purchase price	$10,121,167.28

*Note No. 16 for $64,800.00, representing a portion of principal due January 15, 1921, was not issued, but in lieu thereof this amount was included in the cash payment on June 16, 1921.

During the year, Note No. 1, maturing January 15, 1921, amount $608,500.00, was retired by cash payment made to the Guaranty Trust Company of New York.

Mention was made on page 10 of the Stockholders' Report for the year ended December 31, 1920, that First Mortgage 5% Series "A" Bonds of the Pere Marquette Railway Company, amounting to $3,231,000.00, were authenticated by the Bankers Trust Company as Trustee under the First Mortgage and Deed of Trust, dated July 1, 1916, to cover 80% of expenditures made by the Railway Company for additions and betterments during the period July 1, 1918, to December 31, 1919. These bonds are held for safekeeping by the Central Union Trust Company of New York, New York, N. Y., subject to the order of the Pere Marquette Railway Company.

During the year ended December 31, 1921, application was made to the Interstate Commerce Commission for authority to use these bonds as collateral, and this was authorized by order of the Commission dated May 31, 1921, Finance Docket No. 1397.

During the year ended December 31, 1921, Pere Marquette Railroad Collateral Trust Indenture 4% Bond No. 13, maturing January 1, 1923, par value $1,000.00 was purchased by the Railway Company on account of being defaced and not being good for delivery under the rules of the New York Stock Exchange. This bond was purchased at $930.00 and accrued interest from July 1, 1921, to November 8, 1921, the purchase being authorized by action of the Board of Directors at meeting held on November 2, 1921. This bond, with coupons attached maturing January 1, 1922, July 1, 1922, and January 1, 1923, is in the possession of the Treasurer at Detroit, Mich., for safekeeping.

On July 15, 1921, the Pere Marquette Railway Company issued its promissory note to the Standard Steel Car Company for $645,000, payable June 13, 1922, without interest. This note was issued in connection with an agreement made on May 2, 1921, between the Standard Steel Car Company and the Pere Marquette Railway Company, covering the purchase of 12 passenger coaches and 12 baggage cars.

There were no other changes in the amount of the Company's funded debt or capital stock outstanding during the year ended December 31, 1921.

SECURITIES ACQUIRED

During the year ended December 31, 1921, the Pere Marquette Railway Company purchased at par 50 shares of stock of the Flint Belt Railroad Company, for which it paid $5,000.00 cash.

During the year, the Pere Marquette Railway Company advanced $60,000.00 to the Flint Belt Railroad Company to be used for construction work.

DIVIDENDS

During the year ended December 31, 1921, quarterly dividends at the rate of 1¼% were regularly paid on the Prior Preference Stock. These payments were made out of surplus as of December 31, 1920, and amounted to $560,000.00.

On December 7, 1921, a dividend of 10% was declared on the Company's 5% Preferred Stock, payable on January 3, 1922, to stockholders of record December 15, 1921. This dividend, amounting to $1,242,900.00, was declared out of surplus as of December 31, 1920. Dividends on the 5% Preferred Stock are cumulative after January 1, 1919, and the declaration of 10% covered the period January 1, 1919, to December 31, 1920. The cumulative dividend for the year ended December 31, 1921, amounting to $621,450.00, while not declared, has been accrued and recorded on the books of the company in suspense.

PROFIT AND LOSS

The Profit and Loss surplus carried forward from December 31, 1920, amounted to $4,825,296.79. During the year there was a credit from Income of $3,765,879.96, and there was charged to Profit and Loss dividends declared out of surplus at December 31, 1920, as follows:

Prior Preference Stock 5%	$560,000.00
Preferred Stock 10%	1,242,900.00
Total	$1,802,900.00

The net debit of other Profit and Loss items during the year was $9,850.06, leaving a surplus as of December 31, 1921, of $6,778,426.69, an increase during the year of $1,953,129.90. (See page 23.)

TAXES

The tax accruals on the Corporate books for the year ended December 31, 1921, amounted to $1,408,480.66, as compared with $768,407.38 for the year ended December 31, 1920, an increase of $640,073.28, or 83.30%. This increase was due principally to income and capital stock taxes, as indicated by the following tabulation:

United States Government Income Tax	$334,451.07
United States Government Capital Stock Tax	12,034.00
Canadian Income Tax	10,593.55
Michigan State Ad Valorem Tax	244,797.50
Miscellaneous	38,197.16
Total Increase	$640,073.28

The apparent increases in Michigan State Ad Valorem and Miscellaneous Taxes shown above are due partly to the fact that these tax accruals on the books of the Pere Marquette Railway Company for 1921 represent a twelve-months period, while similar accruals for the year ended December 31, 1920, represent the ten-months period subsequent to February 29, 1920. The United States Railroad Administration paid the Michigan State Ad Valorem and Miscellaneous Taxes for the months of January and February, 1920. The combined Federal and Corporate accruals for Michigan State Ad Valorem and Miscellaneous Taxes for the year 1920 were $980,901.05. Similar accruals on the books of the Pere Marquette Railway Company for the year ended December 31, 1921, were $1,027,205.27. This comparison indicates an actual increase in the Michigan State Ad Valorem Tax and Miscellaneous Taxes of $46,304.22. This increase is due to the increase in Michigan State Tax Rate for the year 1921 as compared with the year 1920.

FLINT BELT RAILROAD

This line will connect with the Pere Marquette main line at McGrew, 3.8 miles north of the station at Flint, and extend southerly 8.2 miles, connecting again with the Pere Marquette main line at a point 5.1 miles south of the station at Flint, passing east of the built-up portion of the city, but being for the most part within its corporate limits. This project will make an extensive territory available for industrial locations, and by operatng the Pere Marquette freight trains over the new line, the congestion along the present route will be relieved.

The amount expended to the end of 1921 was approximately $70,000, being about 10% of the total estimated cost of the project.

FINAL SETTLEMENT WITH UNITED STATES RAILROAD ADMINISTRATION

As the result of prolonged negotiations between the United States Railroad Administration and officers of the Pere Marquette Railway Company, a memorandum of agreement was entered into between the two parties under date of November 2, 1921, whereby the Director General of Railroads agreed to cancel on the Federal books all debit balances versus the Pere Marquette Railway Company covering transactions handled during the period of Federal control, including so-called "Open Account Balances," Materials and Supplies Balances, and amounts due to the Administration for Additions and Betterments. A final agreement between the two parties was duly signed and executed under date of November 12, 1921.

FRANK H. ALFRED, President.

By Order of the Board of Directors,
EDWARD N. BROWN, Chairman.

[ADVERTISEMENT]

Railway Officers

Executive

G. R. Huntington, vice-president of the Minneapolis, St. Paul & Sault Ste. Marie, has been elected president, succeeding **Edward Pennington** who has been elected to the newly created position of chairman. **G. W. Webster,** secretary and assistant to the president, has been appointed vice-president, succeeding Mr. Huntington. These changes were effective May 16.

Financial, Legal and Accounting

W. D. Beymer, controller of the Illinois Central with headquarters at Chicago, has been appointed assistant to the vice-president in charge of accounting with the same headquarters, effective May 1.

Edward W. Wheeler has been appointed general counsel of the Maine Central with headquarters at Portland, Me. In addition to his legal duties Mr. Wheeler will also exercise jurisdiction over matters of public relations, legislative action and leased lines.

Sydney Smith, valuation counsel of the Louisville & Nashville, with headquarters at Louisville, Ky., has been promoted to general attorney, with the same headquarters, effective May 10, to succeed **Ernest Woodworth,** resigned to engage in general practice. Effective the same date, **J. H. McChord,** counsel, has been promoted to assistant to the general counsel, **Ashby M. Warren,** assistant district attorney for the district of Kentucky, has been promoted to assistant general claims attorney, and the jurisdiction of **James J. Donohue**, general claims attorney, has been extended to cover litigation over personal injuries and damages to property.

J. F. Fairlamb, whose appointment as auditor of revenue of the New York Central was announced in the *Railway Age* of May 13, was born in Pennsylvania, in 1855. After his graduation from high school he entered the service of the Pennsylvania as a clerk. In 1884 he went with the New York, West Shore & Buffalo (New York Central) in a similar capacity. In 1886 he went with the New York Central as a clerk. Two years later he became assistant auditor of passenger accounts and, in 1890, auditor of passenger accounts. On March 1, 1906, he was appointed general passenger agent and on February 1, 1910, auditor of miscellaneous accounts, which position he held at the time of his recent appointment.

Operating

C. E. Carson, manager of the Chicago Traffic Club, has been appointed superintendent of the Southern division of the Chicago Great Western, with headquarters at Des Moines, Iowa, effective May 15, to succeed **C. A. Shoemaker,** who has been granted a leave of absence.

W. H. Bevans has been promoted to superintendent of the Western division of the St. Louis-San Francisco, with headquarters at Enid, Okla., effective May 10, to succeed **C. H. Claiborne,** who has been transferred to the Southern division, with headquarters at Memphis, Tenn., to succeed **J. F. Liston,** deceased.

H. W. Purvis has been appointed general manager of the Georgia & Florida with headquarters at Augusta, Ga., succeeding **D. F. Kirkland,** who has resigned to become vice-president of the Southern States Development Company. Mr. Kirkland will also serve as director of development of the Georgia & Florida. Mr. Purvis started what was to become a railroad career when he entered the employ of the Western Union Telegraph Company as an operator at Charlottesville, Va., in 1895. In 1897 he entered the service of the Norfolk & Western and served that company as an operator and agent-operator at a number of places until 1900 when he became an operator-yard clerk for the Seaboard Air Line at Hamlet, N. C. The following year he became a clerk in the office of the chief dispatcher at Raleigh, N. C., and, in 1902, was promoted to dispatcher in the same office. Four years later he was promoted to chief dispatcher at Jacksonville, Fla., and, in 1907, was transferred to Hamlet, N. C. In 1909 he was appointed trainmaster at Hamlet and, in 1912, was transferred to Americus, Ga. In November of the same year he was promoted to superintendent with headquarters at Jacksonville. From August, 1918, to July, 1919, he served as terminal manager under the Railroad Administration of all lines entering Jacksonville and then served for a time as superintendent at Jacksonville. In August, 1920, he was promoted to general superintendent with headquarters at Savannah, Ga., and Norfolk, Va., and in September of the following year was appointed general agent on the general manager's staff, in which position he was serving at the time of his recent appointment.

Traffic

W. R. Graham has been appointed commercial agent of the Southern with headquarters at Hattiesburg, Miss.

H. W. Stigler has been appointed general agent of the Kansas, Oklahoma & Gulf, with headquarters at Memphis, Tenn., effective May 1.

C. M. Shaftoe has been appointed New England passenger agent of the New York, New Haven & Hartford and the New England Steamship Company with headquarters at South Station, Boston.

Mechanical

James E. Goodwin has returned to the Northern Pacific as master mechanic at Duluth, Minn., after a five months' leave of absence and **John A. Marshall,** acting master mechanic, has been appointed road foreman of engines at Duluth.

Engineering, Maintenance of Way and Signaling

L. J. Hughes, assistant engineer on the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been promoted to division engineer, with headquarters at Chicago, effective May 15, to succeed **A. C. Bradley,** who has been transferred to Fairbury, Neb., to succeed **J. G. Bloom,** who has been promoted to engineer maintenance of way of the system, with headquarters at Chicago.

Purchasing and Stores

A. W. Hix, whose appointment as assistant to the director of purchases of the Chesapeake & Ohio was announced in the *Railway Age* of April 29, page 1046, was born at Bramwell, W. Va., on December 10, 1892, and was educated in the public schools and at Massey's Business College at Richmond, Va. On November 24, 1908, he entered the service of the Chesapeake & Ohio in the office of the storekeeper at Richmond. Two years later he was transferred to the purchasing department as stenographer to the assistant chief clerk. From that time on he worked in various positions including those of file clerk, invoice clerk, trace clerk, tabulation clerk and order clerk, in which position he was serving at the time of his recent promotion as noted above.

A. W. Hix